MAY 19, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

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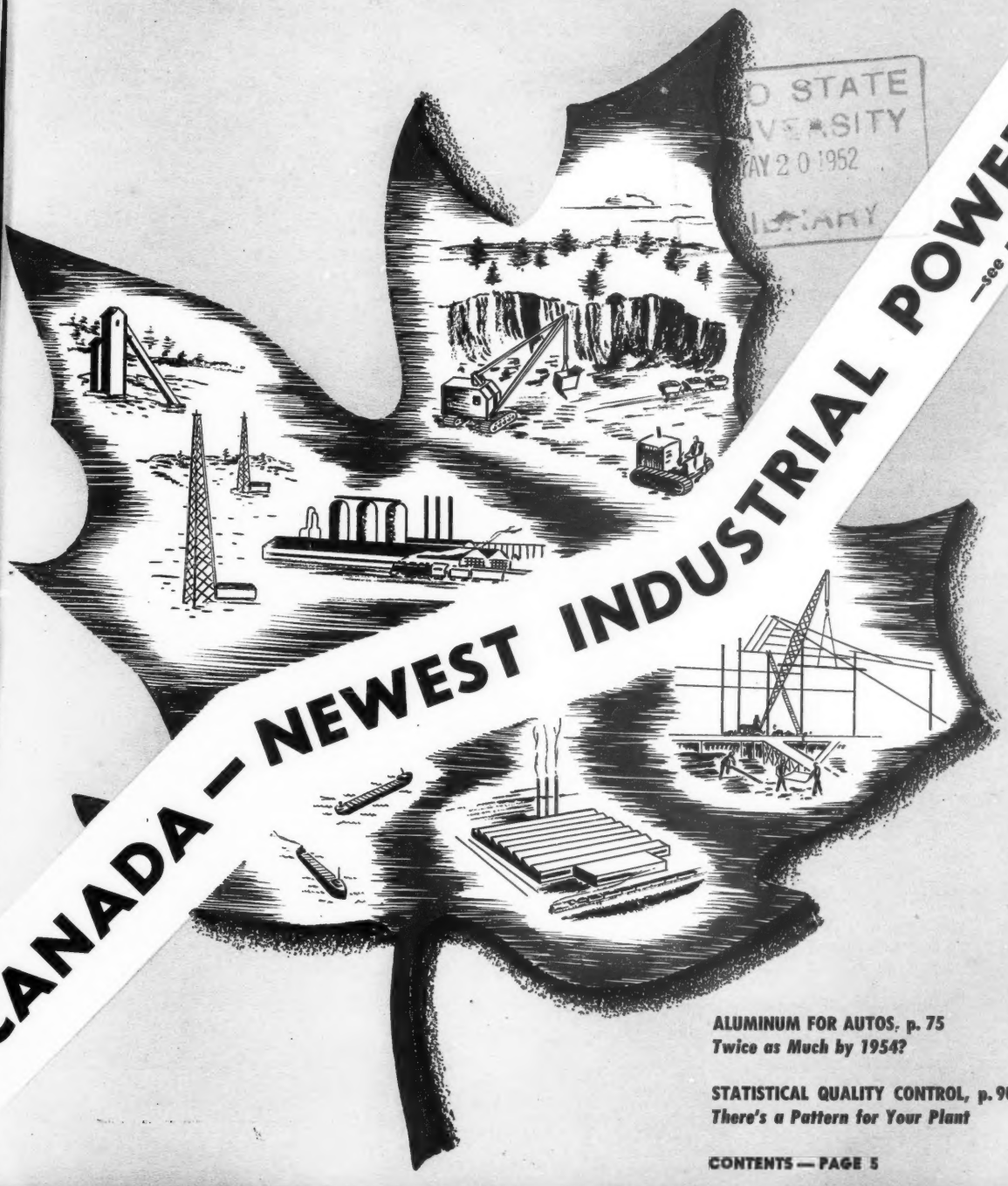

CANADA — NEWEST INDUSTRIAL POWER

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ALUMINUM FOR AUTOS, p. 75
Twice as Much by 1954?

STATISTICAL QUALITY CONTROL, p. 90
There's a Pattern for Your Plant

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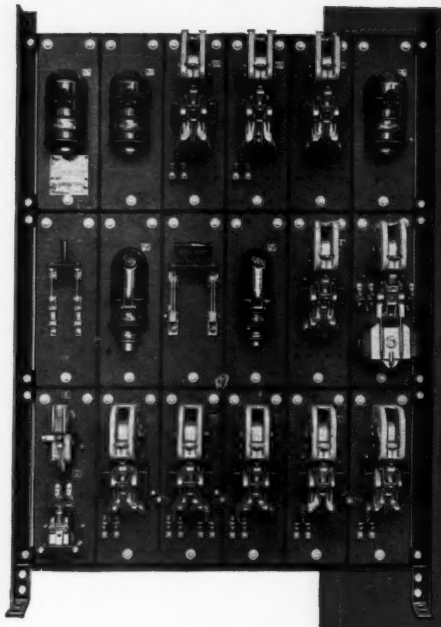


LOOK for these NAMES when buying Motor Control

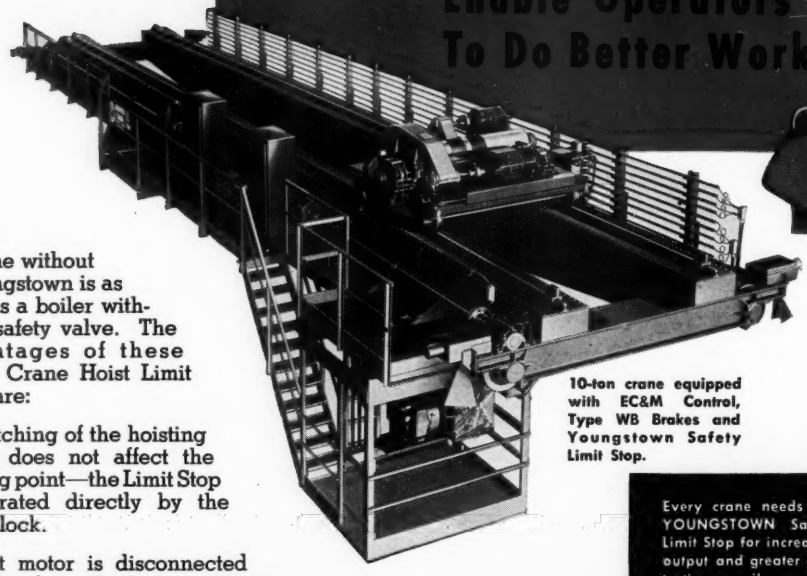
1 LINE-ARC Contactors
2 TIME-CURRENT Acceleration (D-c)
3 FREQUENCY RELAY Acceleration (A-c)
4 WRIGHT CIRCUIT Hoist Control (D-c)
5 YOUNGSTOWN Hoist Limit Stops
6 TYPE WB Brakes
7 CAM Master Switches
8 MANUAL-MAGNETIC Disconnect Switches
9 CONTRA-TORQUE Hoist Control (A-c)
10 TAB-WELD Resistors

These FUNCTIONAL NAMES Speak for Themselves

YOUNGSTOWN *Safety* LIMIT STOPS for Crane Hoists

Eliminate *OVERHOISTING* Fear

Enable Operators To Do Better Work



10-ton crane equipped with EC&M Control, Type WB Brakes and Youngstown Safety Limit Stop.

A crane without a Youngstown is as risky as a boiler without a safety valve. The advantages of these EC&M Crane Hoist Limit Stops are:

1 Stretching of the hoisting cables does not affect the tripping point—the Limit Stop is operated directly by the hook block.

2 Hoist motor is disconnected from the line—high interrupting capacity insures positive opening of the hoist motor circuit.

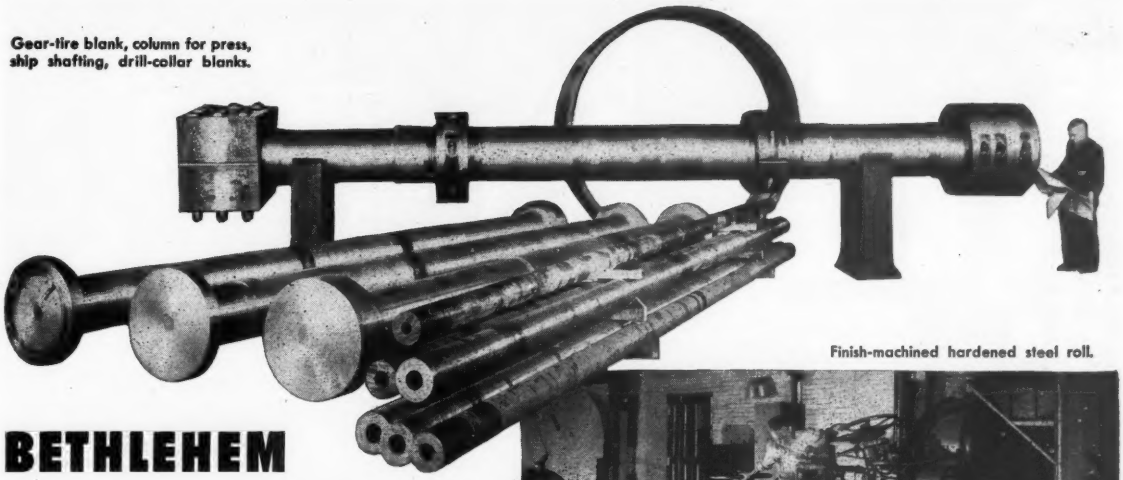
3 "Working ceiling" of area served by the crane is increased, because hook stops quickly when the limit stop trips.

4 Resets automatically—hook lowers out of the danger zone by reversing the controller handle in the cab. Transfer from "tripped" to "normal" connection is rapid. Small travel between these two positions.

5 Compact, easy to mount—only a single suspended weight.

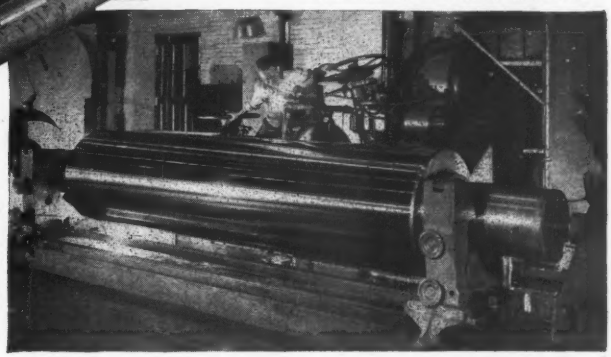
Every crane needs the YOUNGSTOWN Safety Limit Stop for increased output and greater protection—easily applied to new and old cranes. Specify EC&M YOUNGSTOWN Safety Limit Stops for A-c and D-c Cranes.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO



Gear-tire blank, column for press, ship shafting, drill-collar blanks.

Finish-machined hardened steel roll.



BETHLEHEM MAKES SO MANY TYPES OF FORGINGS

We're almost tempted to say we make every type of steel forging. But, to be conservative, we'll say *practically* every type . . . starting with small drop forgings and ending on the top side with giant pieces weighing many tons.

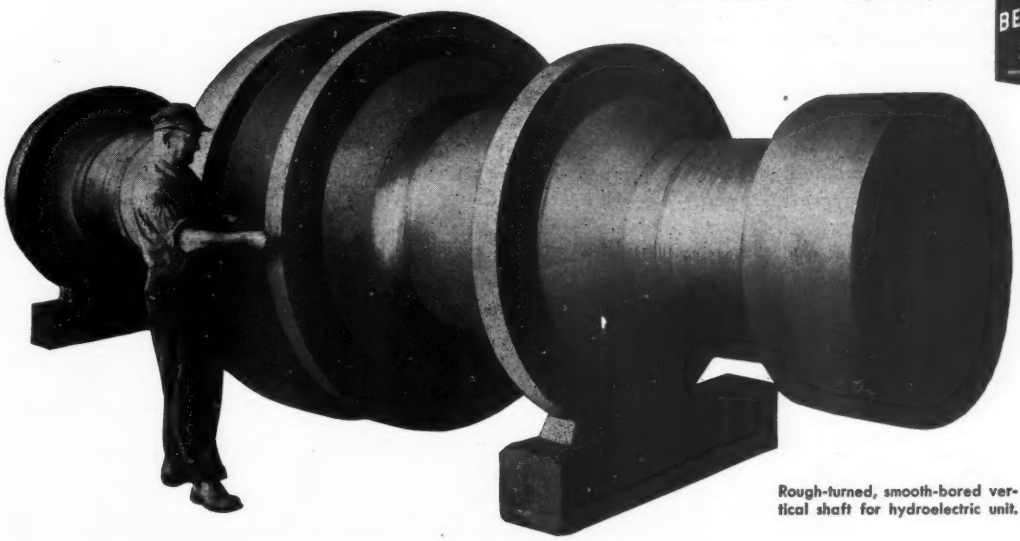
Shown on this page are some random samples of Bethlehem forgings. You would of course see many, many others today on a trip through the Bethlehem shops. You'd see hammers and presses turning out big parts, small parts, and everything in between. You'd see plenty of these items being rough- or finish-machined.

It isn't that we're trying to sound impressive. But we *would* care to have you know how well we're fixed to make and machine forgings. Bethlehem is an old, old hand at this business. Could our experience be helpful to you?

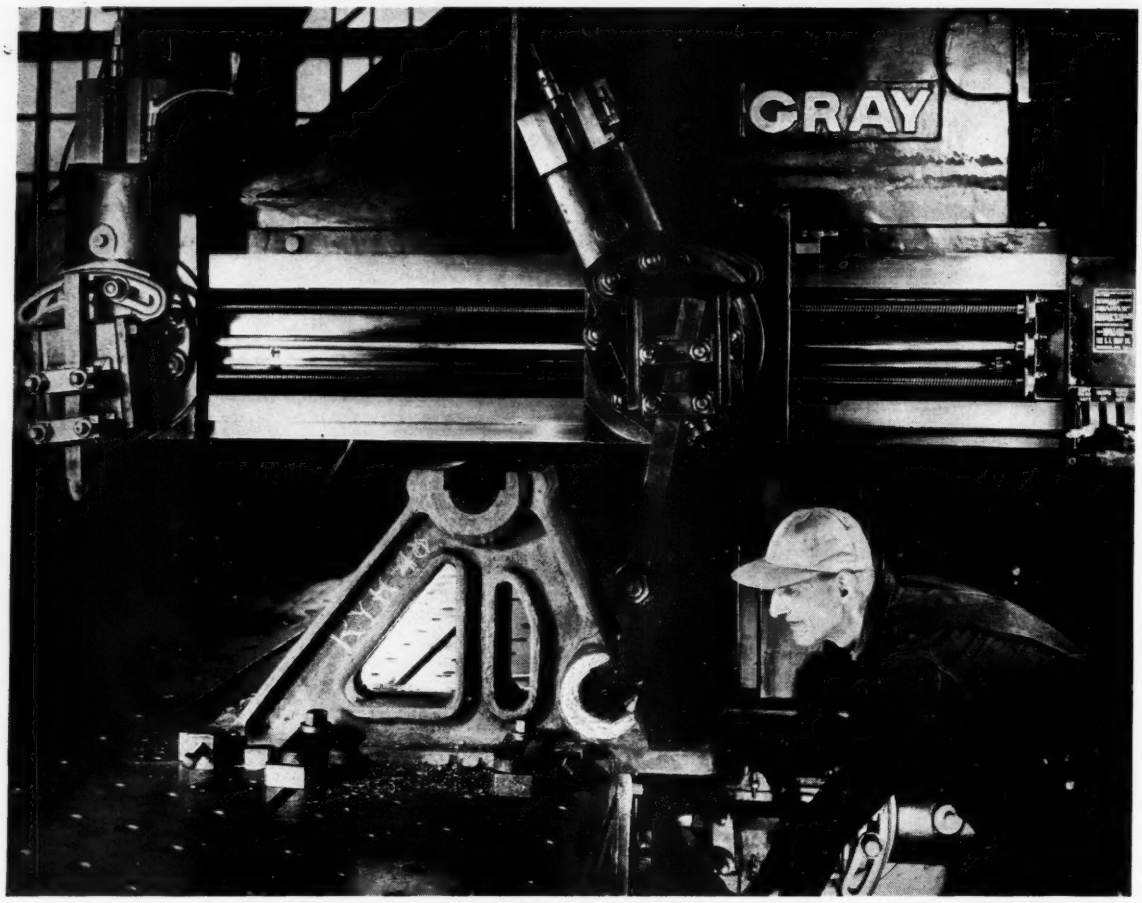
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation; *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Rough-turned, smooth-bored vertical shaft for hydroelectric unit.



His smooth handling brings you better materials-handling

The operator of this giant planer at Barium's Clyde Iron Works, Inc., is really making things smooth for you.

For the steel casting his planer is smoothing off is typical of castings being used by Clyde in fabricating the finest modern materials-handling equipment . . . Whirley cranes, hoists, winches, derricks . . . as well as pile drivers and road rollers.

Whether you need an end-product or raw material, if it's steel, one or more of Barium's fifteen subsidiaries can probably supply you.

For Barium supplies industry with steel in many forms, quality-controlled from blast furnace to finished product. Barium is ready to work as a self-contained unit to speed urgently needed orders. Address your steel needs to Barium Steel Corporation at 25 Broad Street, New York City, New York.

BOLTS — Bayonne Bolt Corporation

STEEL PLATE — Central Iron and Steel Company

PIG IRON — Chester Blast Furnace

CRANES AND HOISTS — Clyde Iron Works, Inc.

SPRINGS — Cuyahoga Spring Company

BOLTS AND NUTS — Erie Bolt and Nut Company

METAL STAMPINGS — Geometric Stamping Company

DROP FORGINGS — Globe Forge, Inc.

HEAVY FLAT DIE FORGINGS — Industrial Forge and Steel, Inc.

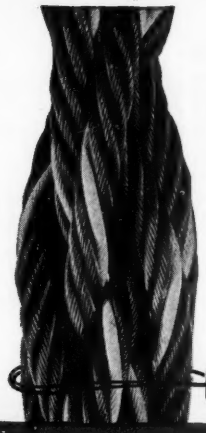
AIRCRAFT ENGINES AND PRECISION ASSEMBLIES — Jacobs Aircraft Engine Company

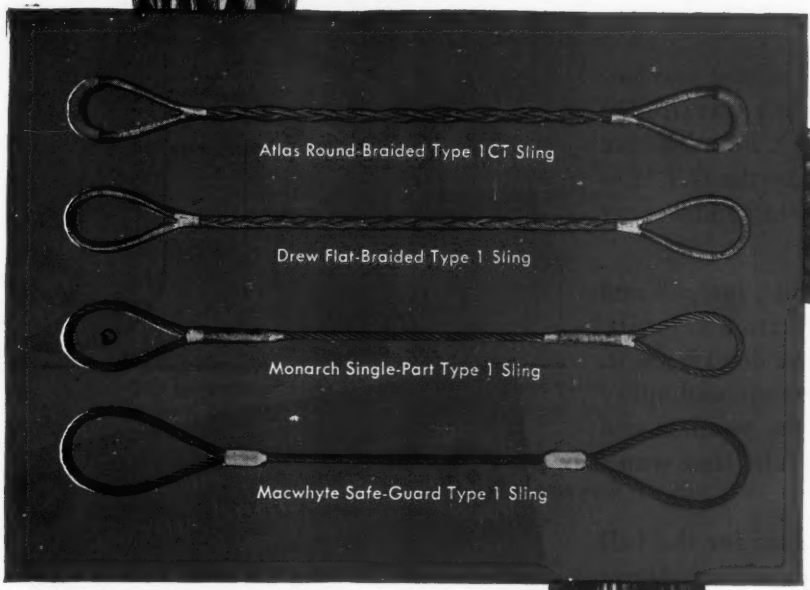
MARINE DIESEL AND GASOLINE ENGINES — Kermath Manufacturing Company, Kermath Limited (Canada)

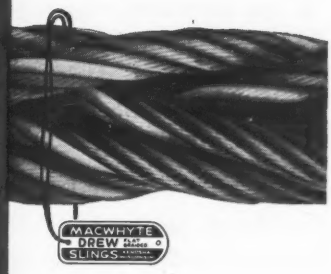
STRUCTURAL SHAPES AND STEEL FABRICATIONS — Phoenix Bridge Company, Phoenix Iron and Steel Company

BARGES AND TUGS — Wiley Manufacturing Company

Slings...any type...any size your job requires




Atlas Round-Braided Type 1CT Sling
Drew Flat-Braided Type 1 Sling
Monarch Single-Part Type 1 Sling
Macwhyte Safe-Guard Type 1 Sling



Macwhyte Slings

Here are four of the hundreds of slings pictured and listed in the newest Macwhyte Sling Catalog. All these slings are made to order in any size with fittings needed for your job. All three types of body are available: round-braided, flat-braided, single-part. Macwhyte has worked with hundreds of sling users toward more efficient materials handling. Our engineers are ready to study your sling needs and make recommendations.

For cranes and hoists specify PREformed Monarch Whyte Strand Crane Rope made by Macwhyte.

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cable, Safe-Lock Assemblies, Monel Metal and Stainless Steel Wire Rope.
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ORTAC hose that answers most of your needs!

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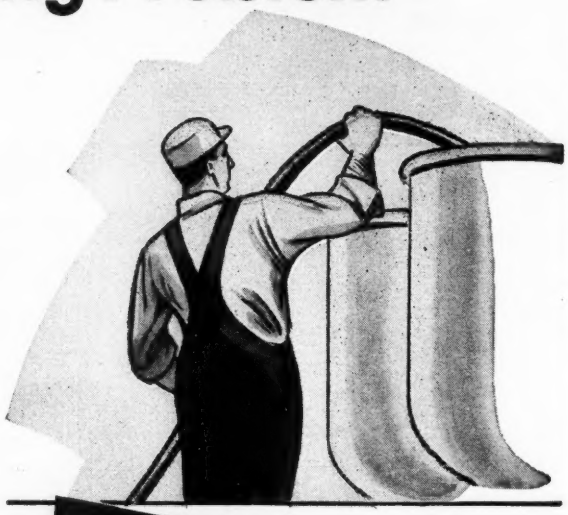
Ask your nearest distributor for the full story of ORTAC—or write Goodyear, Akron 16, Ohio.



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This Week in Metalworking

STEEL

Vol. 130 No. 20 May 19, 1952

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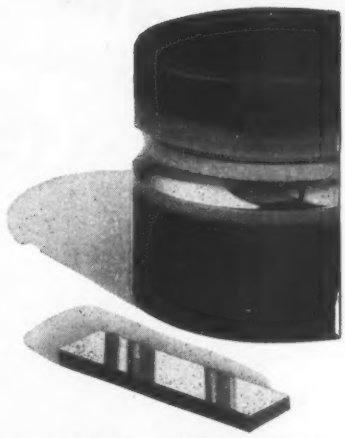

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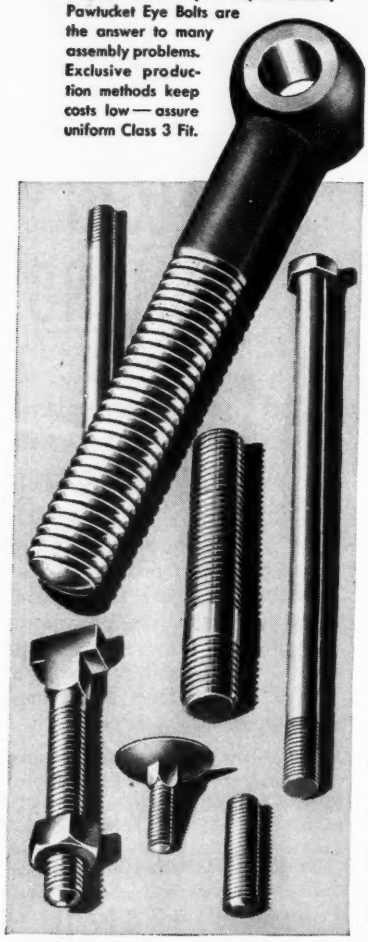

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
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Behind the Scenes...

Cover Story

Managing Editor Walt Campbell enjoyed the assignment of gathering and preparing material for this week's cover story on Canada's industrial progress, which appears to the east of here.

He travelled several thousand miles in Canada, interviewed scores of industrial leaders and government officials, spending a total of six days in the dominion.

"They're ready for a tremendous industrial advance up there," Walt comments. "They've already made considerable progress, but the really spectacular gains are still ahead."

Canadians all sense the vistas opening before them, he points out, but they're optimistic in a hard-headed way—no wild extravagance, conservative government policies and an aura of caution in predictions about the future.

"What delights Canadians most at the moment," says Walt, "is that at long last the Canadian dollar is worth more than the U. S."

Traveller

Although the managing editor has reached distant areas in past weeks, Editor Irwin Such has chalked up greater mileage. At the peak of the convention season that comes around at this time each year, he always does a lot of road work.

In mid-April he visited the Seigniory Club in Monte Bello, Que., where the Society of Business Magazine Editors, of which he is president, and a group of Canadian editors held a joint meeting. Later in April and early May came a Chicago junket so he could be on hand for meetings of the Metal Powder Association and National Machine Tool Builders' Association. On May 10 he was in Washington for the annual dinner of the Gridiron Club. Last week he covered the Hot Springs, Va., meeting of the Industrial Furnace Manufacturers Association, and next week he'll be in Atlantic City and New York for the American Supply and Machinery Manufacturers Association and American Iron & Steel Institute gatherings. Next month he'll be around for the Material Handling Institute meeting.

On Reading

Koppers Co. has come up with a fine idea. To help executives wade faster through the stacks of literature on their desks, it has set up a rapid reading course, conducted by the University of Pittsburgh. As a pilot study, 20 key men spent two hours a week for 15 weeks learning how to read better. They boosted their scores by 28 per cent.

Youngest

You'll be surprised to learn that Houston is the youngest city in the U. S. and Los Angeles is the oldest. The median age of people in Houston is 29.2, but in Los Angeles it's 33.6 years. A Detroit statistician, John Stewart, figured that out.

Use for TV

We note a trend toward the use of television in stockholders' meetings. Foote Mineral Co., Exton, Pa., is one that has used the medium. Its 200 stockholders toured the 81-acre Foote plant by merely staying in their chairs. Cameras manned by personnel of Radio Corp. of America were set up at strategic locations to show the owners key steps in the processing of lithium, zirconium and welding rod coating materials.

Puzzle Corner

In the puzzle of May 5, the car goes 40 miles. First in with that answer were L. D. Rice of Timken Roller Bearing Co., T. S. Bean of Barber & Ross Co., George W. Frederick of Republic Steel Corp., Robert W. Huff of Canton, O., R. R. Rychener of National Gypsum Co. and Ralph Pappeneheimer of Specialty Device Co.

Here's a puzzle in logic for this week: George deposits $50 in the bank on Monday. On Tuesday he withdraws $20, leaving $30. On Wednesday he withdraws $15, leaving $15. On Thursday he withdraws $9, leaving $6. On Friday he withdraws the $6, leaving nothing. Why do the withdrawals add up to $50 and the remainders to $51?

Shrdlu

(Metalworking Outlook—Page 53)

No wonder they keep coming to

MULTIPRESS®

Accurately gauging laminations for solenoids used in timing devices and other electrically controlled equipment is one of several unusual Multipress jobs at the National Acme Co., Cleveland, Ohio.

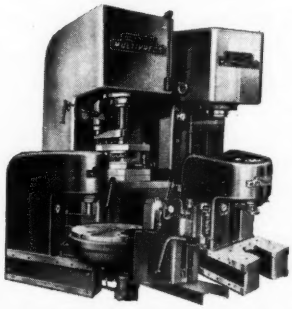
An adjustable gauge bar is attached to a solid steel block which is mounted on the ram of a 4-ton Multipress. As the gauge bar descends with the ram and contacts a stylus connected to an indicator dial, the accuracy of thickness of each stack of laminations is instantly and automatically shown — *in ten thousandths of an inch.*

Multipress is five times faster than the previous method of compressing the parts in a vise and gauging them with a hand micrometer. Rejects have been cut sharply, as all parts are evenly compressed, and checked under exactly uniform pressures.

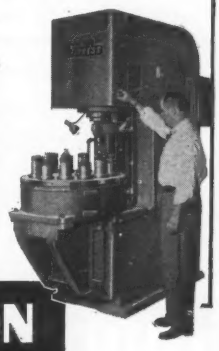
For a difficult broaching operation on a part that had to be "handled with care," Fee and Stemwedel, of Chicago, turned to Multipress—and results were more than satisfactory.

With a single ram stroke, the 6-ton Multipress above puts 120 close-tolerance serrations around the rim of a thin-walled compass bezel made of half-hard brass. The notches are .018" deep; allowed tolerance is only .003" plus or minus. At a production rate of 800 units per hour, scrap losses average less than two per hour and these *are due entirely to incorrect placement by the operators!*

Multipress does the work with automatic accuracy. Women operators with no special training get perfect results—and they like the smooth, easy, quiet, *safe* action of Multipress.



Smooth, rapid power control and accurate, widely adjustable action make Multipress the quick, cost-cutting answer to better results on hundreds of production jobs. In addition, Multipress is specially designed for easy tooling of the widest variety. Built in eight basic frame sizes, with capacities ranging from one ton to 50 tons, it offers a choice of manual and automatic controls, valving for many special types of ram action, and automatic single or sequence cycling. Hydraulically interlocked Index Table Feeds, Automatic Stock Feed and many other Multipress accessories available. Write today for full details.



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1163 Dublin Road, Columbus 16, Ohio

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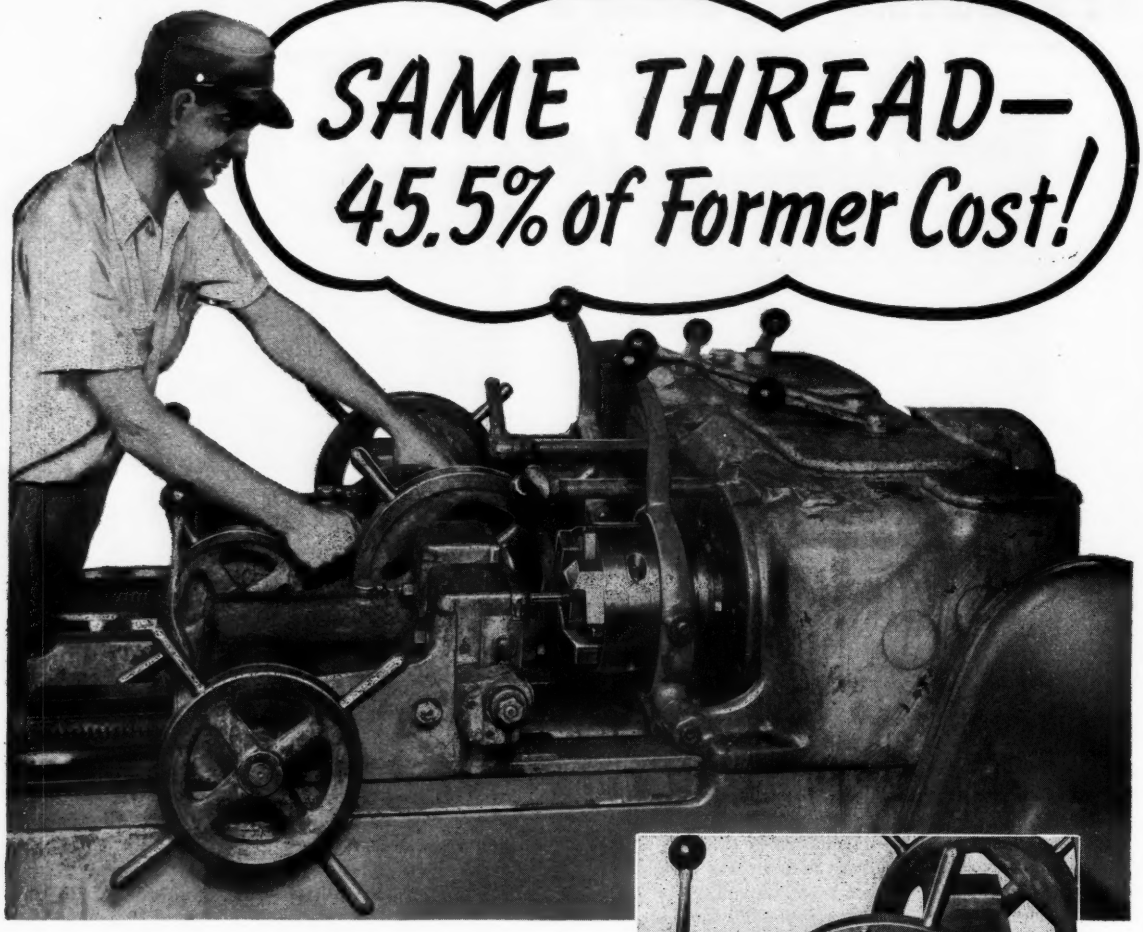

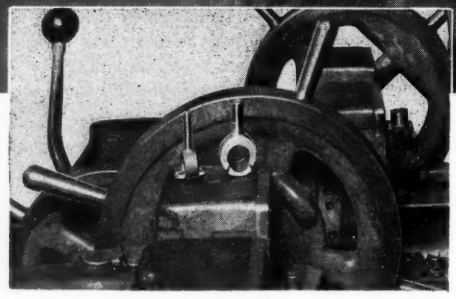

Eye bolts, for use in the assembly of switchgears, are now threaded on 1" Double LANDMACO Leadscrew Threading Machines in the Philadelphia plant of a large Eastern manufacturer. Records show that costs by previous methods averaged 120% higher.

Three sizes of eye bolts are threaded from high tensile bronze and copper castings—3/8", 1/2", and 5/8". 16, 13 and 11 pitch National Coarse threads respectively are cut for lengths varying from 15/16" to 1 5/8" at cutting speeds of 302 and 217 RPM's.

Lower tool cost has been an important factor in the overall cost reduction from threading these parts with LANDIS Equipment. Approximately 25,000 pieces are produced between each regrinding of the chasers. This combined with the fact that LANDIS Chasers are reground and used for most of their original length has brought tool cost down to a minimum.

This is one of many examples where LANDIS Threading Equipment has significantly reduced operating costs—others show increased production, better quality, lower maintenance, etc. Further information on LANDMACO Leadscrew Machines and all LANDIS Threading Equipment will be furnished promptly on request. Please give specifications when writing.

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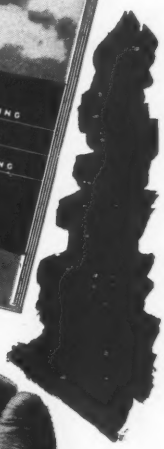

60 PAGES

OF APPLICATION AND SELECTION AIDS for

AIR HANDLING

AIR CONDITIONING

AIR CLEANING

PLANT ENGINEER

PRODUCTION MANAGER

Here, for consultants and engineers as well as any plant executive with an interest in the selection and application of equipment, is a brand-new, 60-page catalog. It covers the entire line of air handling, air conditioning and electronic air cleaning products. It gives hundreds of applications throughout industry. Its reference data section provides handy tables and formulas for figuring your requirements and applying the equipment.

Over one hundred illustrations show the products and typical uses. Condensed capacities and dimensions simplify their selection. A Quick-Finder Chart shows you at a glance which products best fit the application, and a Quick-Finder Index with colored tab guides refers you to those products, quickly.

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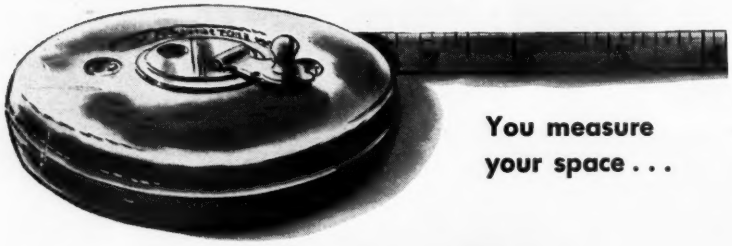
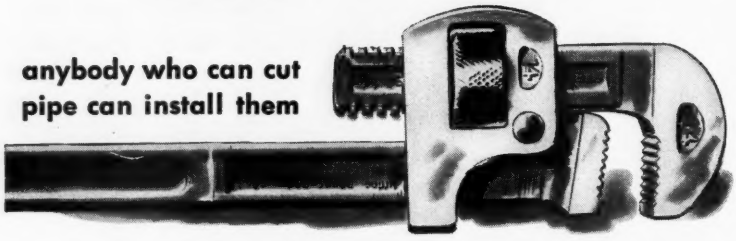


You measure your space . . .

anybody who can cut pipe can install them



Here's inexpensive built-in carbon dioxide fire protection against normal flammable liquid and similar hazards.

The new Kidde Standard Pak is a ready-made, pre-engineered fire extinguishing "package" for volumes up to 6,000 cubic feet. Anyone who can cut pipe can install it. Each kit contains dependable Kidde rate-of-rise heat detectors, efficient Kidde Multijet nozzles, and automatic discharge heads. Paks are supplied with or without pipe and fittings. Optional accessories include pressure trips and switches, remote controls, sirens, gongs.

A choice of six sizes assures you of the right package for your particular requirements. For full information send us coupon below.

Kidde

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Please send me details on the
New Kidde Packaged Fire Extinguishing System

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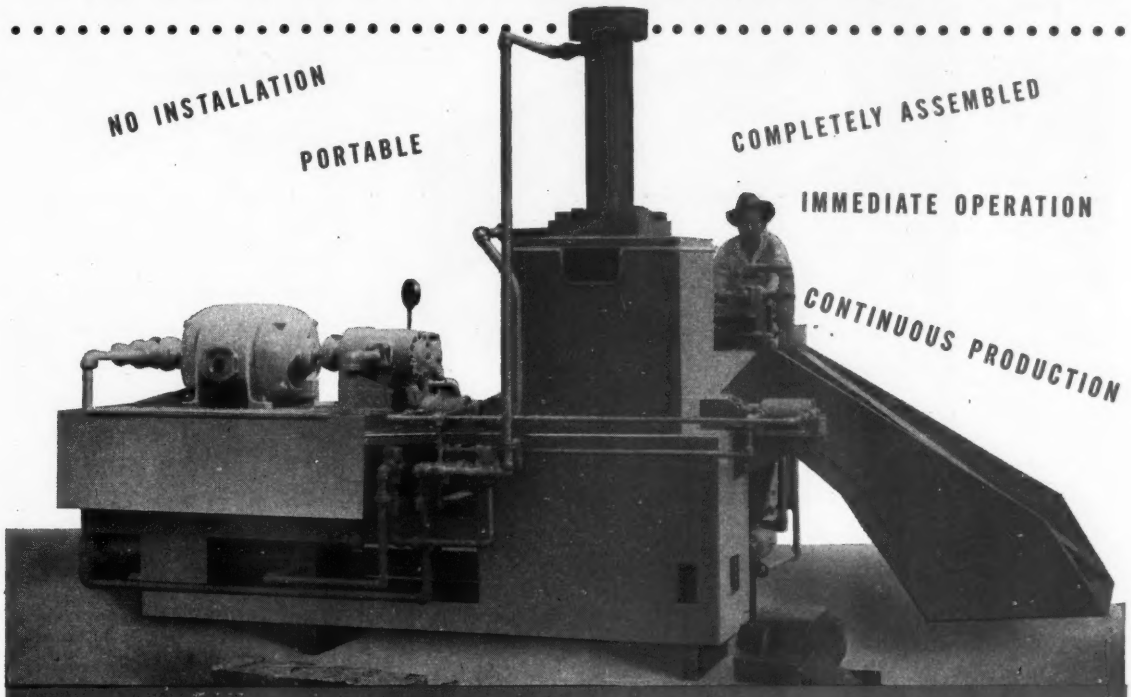
Harris Non-Ferrous Metals Baling Presses

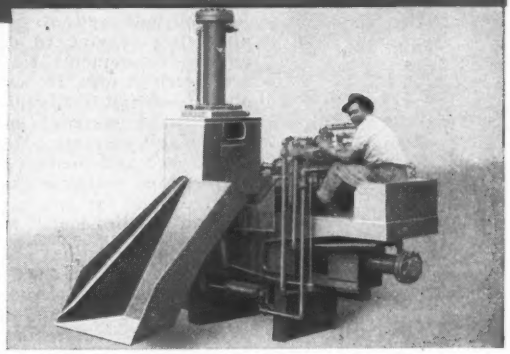


Bundle Size Attracts Dealers and Smelters

The HARRIS Non-Ferrous Metals Baling Presses were designed primarily for use in baling non-ferrous scrap. A particular feature of this design is that continuous baling is obtained, since the charging box is open while the bale is being made and ejected. The charging box is large enough to handle bulky material such as wire, sheets, etc. Pressures used make an exceptionally dense bale—approximately 40% density.

Dealers find these presses excellent also for baling sheet iron clippings and tin cans. The size and density of bundles are especially attractive for charging in electric furnaces.

The three models of this design provide an ample range to meet all requirements.



Size of Charging Box	33" x 33" x 24"
Average number of bales per hour	60 - 70
Size of Electric Motor	50-Hp. 1200 Rpm
Vickers Vane Type Rotary Pump	2,000 lbs. per sq. in.
Space Required	10' x 12'
Shipping Weight	20,000 lbs. (approx.)

AVERAGE SIZE OF FINISHED BALE

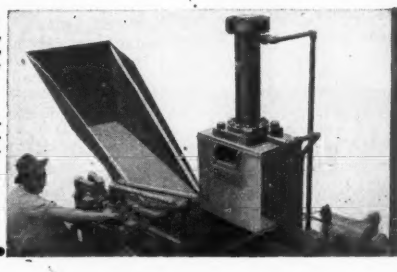
NF-40.....5" x 5" x 15"
NF-50.....5" x 7" x 15"
NF-80.....8" x 8" x 15"

AVERAGE WEIGHT OF BALE

NF-40 .....40-60 lbs.
NF-50 .....50-70 lbs.
NF-80 .....80-100 lbs.

AVERAGE TONNAGE PER HOUR

NF-40 One and one-half tons
NF-50 Two tons
NF-80 Two and one-half tons



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Reclamation Engineers Since 1889

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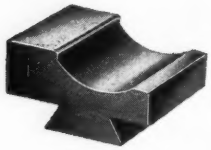
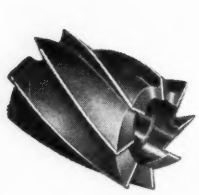
with *Gorham*-ENGINEERED SPECIAL CUTTING TOOLS





Next time you're up against a tough tooling problem, call in the man who can give you *the right answers fast* . . . your nearby Gorham Field Engineer! He's an expert in special cutting tools . . . and he's ready to provide a complete engineering service to determine your exact tooling requirements. He starts with your product, sketch or idea. He surveys your production operations and available equipment. He considers work material properties and desired finishes and tolerances. He plots proper machine feed, speed and method of tool driving. Then he develops practical design and engineering specifications for special cutting tools, metallurgically "tailor-made" for your application.

His recommendations are backed by Gorham's unmatched facilities, which include three fully-equipped modern plants, a large Engineering and Metallurgical staff, and a force of field application engineers in principal industrial centers, coast-to-coast. All are dedicated to furnishing prompt and profitable solutions to your special tooling problems. Gorham-engineered "specials" are turning problems into profits in thousands of plants every day . . . why not let them do the same for *you?* If you haven't met your nearby Gorham Field Engineer, write for his name, or send details of your problem direct for recommendations.

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"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

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LETTERS
TO THE EDITORS

Lining Stirs Interest

Under the Producion News at a Glance item headed "Longer Pot Life" (Apr. 14, p. 91) you mention a refractory lining which may be attached to the inside of a galvanizing pot to increase its life. Can you tell us where we can get more information on this item.

G. C. Price, president
Electrical Mfg. Co.
Battle Creek, Mich.

. . . I am very much interested in securing some more information.

W. L. Dull, superintendent
Wire Mills
Sheffield Steel Corp.
Houston

. . . where may I obtain further detailed information on this development.

R. J. Maloit, metallurgist
American Steel & Wire Division
U. S. Steel Co.
Cleveland

. . . we will appreciate knowing who might be able to supply the thin refractory lining mentioned.

E. C. Werner, president
New Delphos Mfg. Co.
Delphos, O.

We are very much interested in this development . . .

R. Diaz
Metal Coating Corp.
Chicago

. . . where can I obtain more complete information?

M. R. Allison
assistant general superintendent
Leetsdale Works
Bethlehem Steel Co.
Pittsburgh

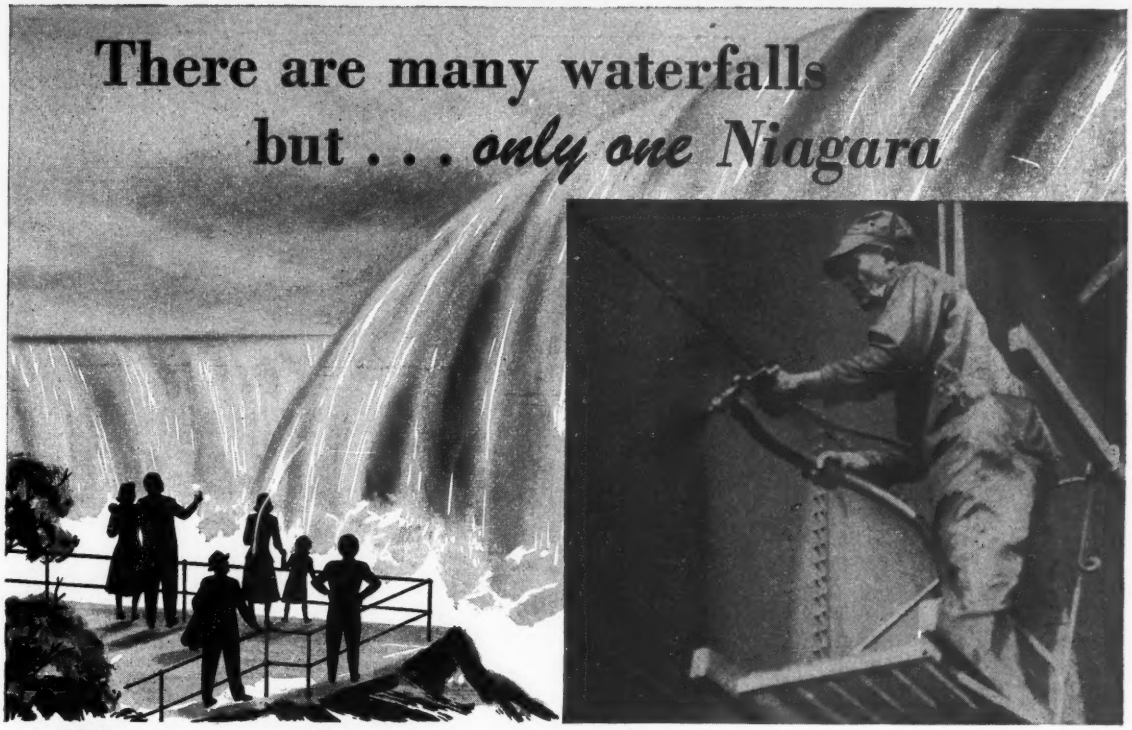
• *Write to Wallace Imhoff, president, Wallace G. Imhoff Co., North Highland, Calif.*

Bakers Have a Place

We find your 1952 "Metalworking Facts and Figures" (Jan. 7, p. 167) very interesting and informative. It would be even more helpful if we knew which classification of the various manufacturers listed we fall within. We manufacture the heavier bakery equipment for retail and wholesale bakeries, such as ovens, proof boxes, fermentation systems and bread coolers.

C. F. Briggs, vice president
E. J. Chubbuck Co. Inc.
Oakland, Calif.

• *As a manufacturer of bakery equipment you would fall under classification 3551 in the Standard Industrial Classification.*



There are many coatings but . . . *only one* INSUL-MASTIC

INSUL-MASTIC pioneered heavy coatings—of *superior* quality. Years of thorough testing and experimentation, by corrosion plagued chemical companies, proved conclusively that long term protection against acids, alkalis and weather was at long last possible, through the use of INSUL-MASTIC.

The government confirmed this finding—INSUL-MASTIC being the only mastic coating ever approved under the original rigid specification for "mothballing" the war materiel.

INSUL-MASTIC *superior* coatings brought about changes in coating specifications throughout industry. The extremely long life and very low moisture vapor penetration rate of INSUL-MASTIC were the qualities that industry was seeking in its fight against corrosion and moisture penetration. The proven formulae which brought this enduring protection are patented and *cannot be duplicated* . . . there is only *one* INSUL-MASTIC.

Tests by the National Bureau of Standards and other impartial laboratories* prove the value of INSUL-MASTIC's basic ingredients for increasing coating life. Those ingredients are a maximum percentage of Gilsonite and *carefully* chosen mica and asbestos.

INSUL-MASTIC Vaporseal Coatings will prevent corrosion under severe chemical conditions, and will vaporseal insulation or building walls.

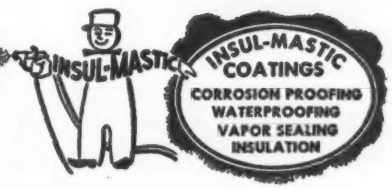
INSUL-MASTIC Type "D" Insulation will control condensation or prevent 65% of heat loss.

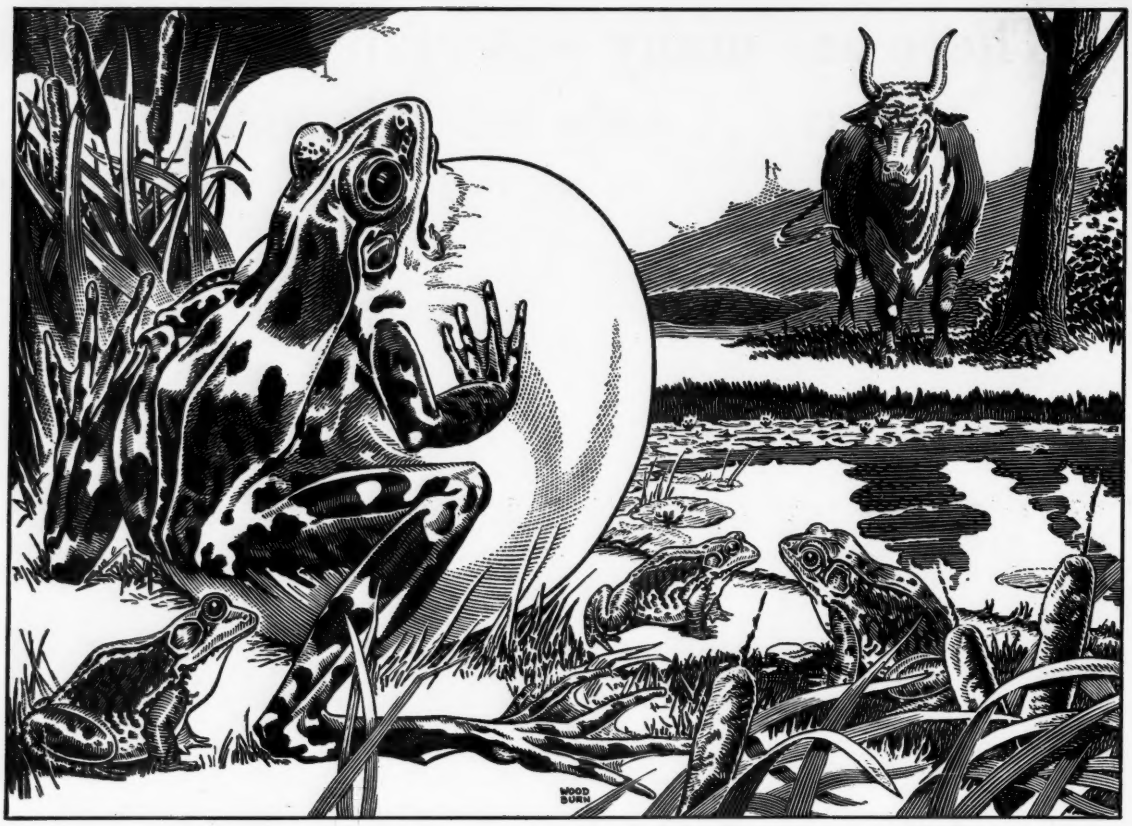
There is only *one* INSUL-MASTIC—Write for the name of our nearest licensee.

Think first of the coatings that last!

* *Names on request*

Insul-Mastic Corporation
OF AMERICA
1166 OLIVER BUILDING · PITTSBURGH 22, PA.
Representatives in Principal Cities





"It's foolish to try to be bigger than you are"

REMEMBER Aesop's fable of the frog and the ox? Told 2,500 years ago, it goes:

"Three young frogs cried to their mother that a little brother had been trampled by the largest beast in the swamp. 'Oh, no,' said the mother, 'no beast is larger than I.' And she blew herself up to show how big she really was. 'But it was much bigger,' the little ones chorused. Whereupon the vain mother inflated herself until she burst." And the moral was, "It's foolish to try to be bigger than you are."

Aside from the wisdom of the fable for each of us individually, there is solemn warning for us as a nation. Some among us seem to believe that with an unlimited supply of taxpayers' dollars America can buy anything--ease and security at home, acceptance of our ideas abroad, friendship of other peoples, even world peace.

Like the vain frog, America inflates herself more and more dangerously, trying to stretch herself to be the biggest thing in the swamp. Meanwhile the enormous beast that is the world goes its own way, scarcely affected by the vainglorious display of America's inflation. It's the same old world that was indifferent before the pomp of Egypt, Persia, Greece and Rome.

How will our present "puffing" end? Isn't it obvious that continued inflation can bring disaster? Only by a realistic policy of living within our means--not trying to be bigger than we are--can America avoid the catastrophe of Aesop's foolish frog.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio

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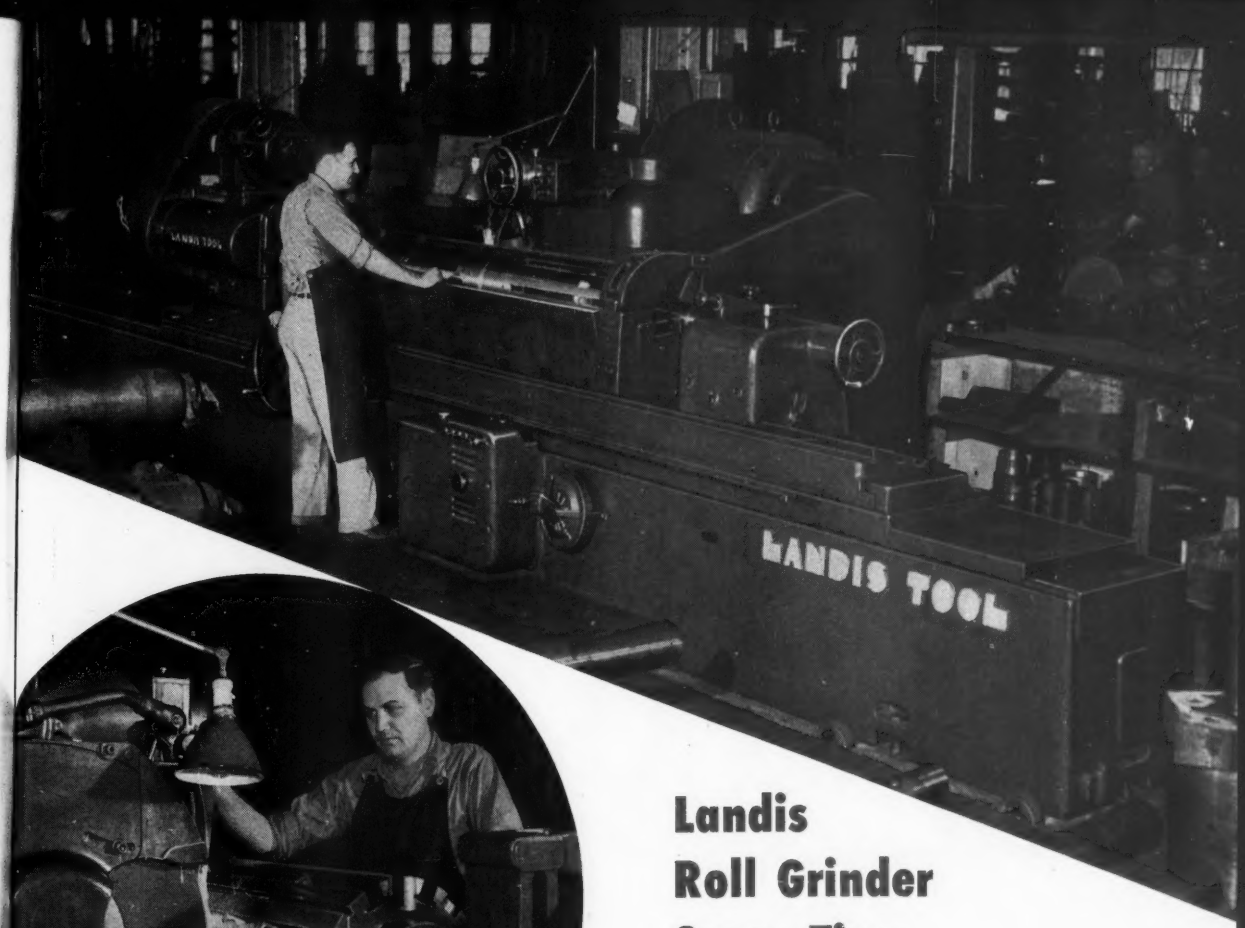
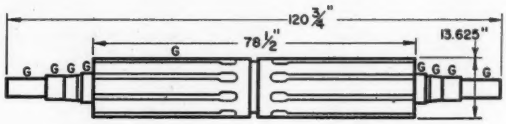
MANUFACTURERS OF CARBON · ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.



WORK DATA
Machine: Landis 24" x 144" Type FR Roll Grinder
Stock Removal: .025" on main diameter
Tolerance: Body Diameter, .002"
Taper Gauge to Face of Cylinder, ± .001"
Time: 6 hours floor-to-floor



Landis Roll Grinder Saves Time Grinding Slotted Cylinder

At Wood Newspaper Machinery Corporation, this new Landis Roll Grinder has replaced an older machine. The intermittent cut on the body and precision limits on the taper makes this an unusual job. The work piece weighs 3,500 lbs.

They are doing two extra grinding operations on this machine and still save one hour on floor-to-floor time.

Production and quality improvements like these can be made on your grinding operations with modern Landis Grinders. Write for Catalog F-48. Landis Tool Company, Waynesboro, Penna.

145A

LANDIS
precision grinders

FLAT SPRING STEEL

No more waiting! Roebling's expanded facilities can meet your needs right now!

PROMPT! FAST! . . . that's the sort of deliveries you can count on now for Roebling high carbon flat mechanical spring steel. For many years Roebling has had one of the largest specialty mills in the country and today's expanded facilities have boosted production to new highs.

Roebling flat spring steel is made as you want it . . . annealed, hard rolled untempered; scaleless tempered; tempered and polished, blue or strawed. And from open hearth to finished product, Roebling positive control assures uniform quality . . . saves preparation time for users . . . brings faster, smoother production.

Roebling is ready to furnish flat spring steel with the exact mechanical properties required for any special type of application. Write or wire now for full information. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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Productioneered

...for low-cost, medium-sized Screw Machine Work

Incorporating the most modern principles of operation and convenience, the new No. 4 Brown & Sharpe Automatic Screw Machine is engineered throughout to give you outstanding production—"Productioneered" for high output, heavy cuts, close tolerances, and fine finishes.

Brown & Sharpe

B·S

Productioneered

Modern in design, massive in construction, the New No. 4 Brown & Sharpe Automatic Screw Machine shortens set-up and operating time . . . assures continuous, accurate production of medium-sized parts for cameras, automobiles, business machines, time fuses, and other defense items. Wide range of speeds and high-to-low speed ratios make possible highest cutting efficiency on a wide variety of materials and work diameters. Other important features include:

Full Antifriction-Bearing Spindle—positive chain drive delivers full power at all speeds.

Vertical Slide—provides additional tool slide.

Automatic Oiling — assures long, trouble-free operation.

Efficient Splash Guard—confines coolant spray—readily rolled aside for set-up.

Automatic Accelerating Mechanism — permits speeding up camshaft for any idle portion of cam contour.

Additional Features—see back of opposite page.

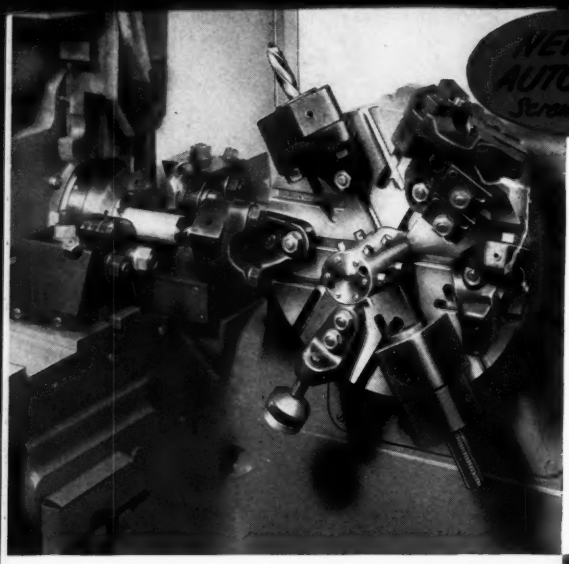
Brown & Sharpe

NEW No. 4 AUTOMATIC Screw Machine

Capacity —
takes stock to 1½" dia., or where work permits, round stock to 2" dia. (to 2⅜", with outside feed) and hex stock to 1¾" across flats.

Spindle Speed Range —
168 two-speed combinations from 17 to 1965 R.P.M. in ratios from 2.2:1 to 13:1.

Production Rates —
52 rates of production from 12 to 800 seconds per piece.



B·S

Productioneered

for heavy cuts—close limits . . .

Unusually firm tool support is provided on the New No. 4 Brown & Sharpe Automatic Screw Machine. Flat-faced turret permits bolting tools directly to face . . . allows ample room for indexing large overhanging tools. Cross slides are rigidly mounted in scraped ways that are cast integrally with machine bed.

B·S

Productioneered

for quick, easy set-up . . .

The New No. 4 has an independent stop for each turret tool position—eliminates need for setting tools to exact distances.

Separate motor for operating mechanism can be "jogged" to facilitate positioning of tools, or complete cycle of operation can be run through by hand.

Spindle speeds and direction, as well as ratio, are quickly selected by simple changes of pick-off gears. Driving sprockets and chains remain untouched.

B·S

Productioneered

for simplified stock loading . . .

A sturdy stock loader on this machine introduces new bar with minimum effort. Ball-ended spider wheel moves stock rail forward to engage stock in feed finger. Stock rotates on cushioned rolls in stock rail—minimizes operating noise.

WRITE FOR NEW ILLUSTRATED BULLETIN
DESCRIBING THE NO. 4 AUTOMATIC SCREW MACHINE

PRINTED IN U.S.A.

Brown & Sharpe

B·S

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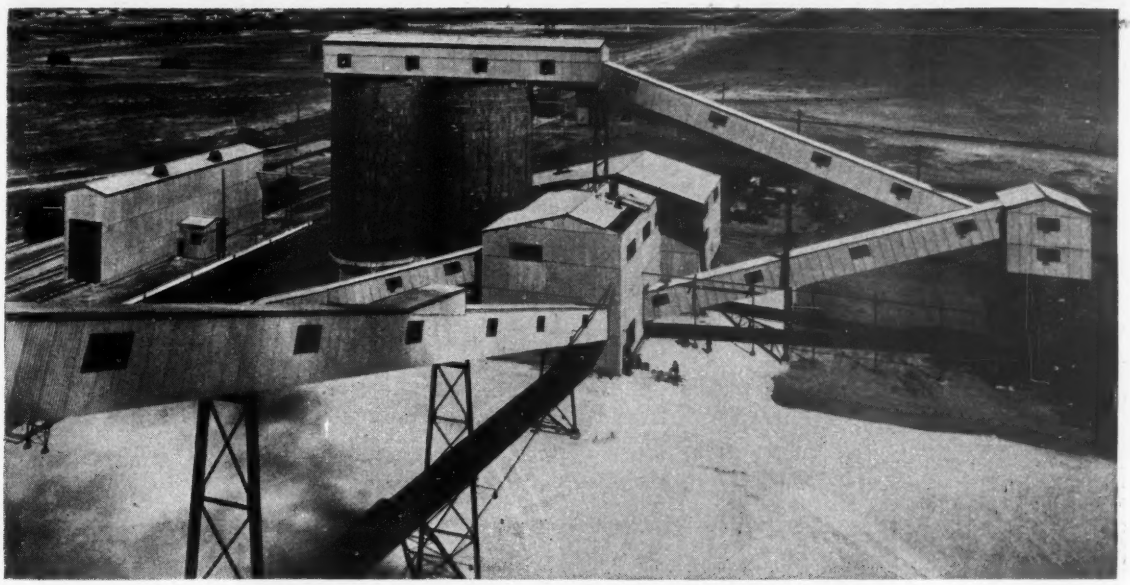
BROWN & SHARPE MFG. CO., PROVIDENCE 1, R. I., U. S. A.



This large industrial power plant moves 200 tons of coal per hour from track dump hoppers through storage silos to bunkers on Link-Belt Conveyors.

Rely on one source... one responsibility for the best in belt conveyors

LINK-BELT engineering experience plus quality components combine to cut handling costs

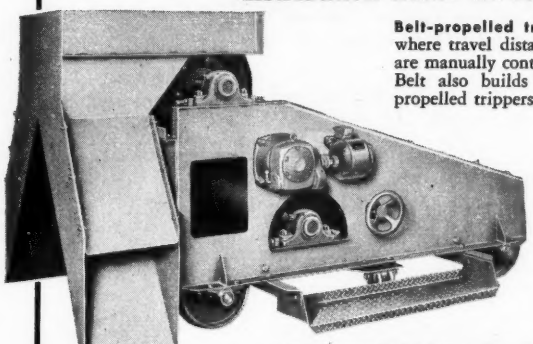
WHETHER you must move a few tons a day or several thousand tons per hour . . . whether the haul is measured in feet or miles—you'll find the answer in belt conveyors at Link-Belt.

Here's a nation-wide engineering organization that will follow through from start to finish—the designing, manufacturing, erecting of conveying equipment. And nowhere can you match Link-Belt's combination of vast application experience . . . complete line of quality components . . . expert coordination of related equipment.

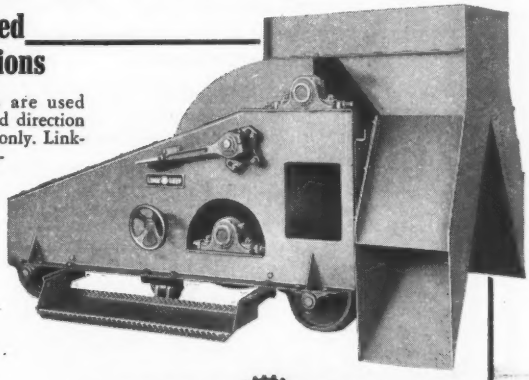
Get all the facts from the Link-Belt office near you. Link-Belt engineers are glad to work with you and your consultants—help you get the finest in belt conveyors.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

LINK-BELT Trippers offer controlled distribution under all conditions



Belt-propelled trippers are used where travel distance and direction are manually controlled only. Link-Belt also builds winch-propelled trippers.



Motor-propelled trippers for continuous, uniform distribution of material along conveyor or for frequent movement to various fixed discharge locations.

12,685

LINK-BELT

BELT CONVEYOR EQUIPMENT

W.H.Q.* for Forging Engineering!

* WORLD HEADQUARTERS

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Increasing this important function of our business means that we have increased our capacity and ability to help you solve your forging problems!

The door is always open. Bring your prints and samples of hot or cold forging jobs. No obligation, of course.

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TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Photo Courtesy of Golden Foundry Company, Columbus, Indiana.

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with mighty rigid "Specs"

For rugged dependability, many of the nation's leading truck lines will agree, you can't beat a Cummins Diesel engine. A good reason for that reputation can be found in the rigid requirements for all component engine parts—including the block and cylinder head castings shown above.

To meet these strict requirements, the foundry which furnishes the castings has long made it a point to use only the finest pig iron—including Republic CHATEAUGAY. And the result: *Uniform high strength and machinability throughout every casting,* despite intricate passages and adjoining light and heavy sections.

A Republic Pig Iron Metallurgist will be glad to give you the complete facts about CHATEAUGAY Pig Iron. Write, wire or phone:

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"REPUBLIC" (Northern) Foundry, Basic and Malleable

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LIGHT COSTS for HEAVY LOADS

up to 15 tons

Where your service requirements do not demand a P&H Heavy-Duty Crane, a Trav-Lift is the sensible answer. They're available in capacities up to 15 tons with various spans and lifting speeds — with floor or cage control.

P&H Trav-Lift Cranes are always tailored to fit your specific needs — with the same safety factors as a heavy-duty crane. Standard, cost-saving designs, combined with many quality features, make the Trav-Lift a modest investment that will pay you big dividends for years to come.

Ask a P&H materials handling engineer to analyze your requirements.

Handle it "thru-the-air" at lower cost.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

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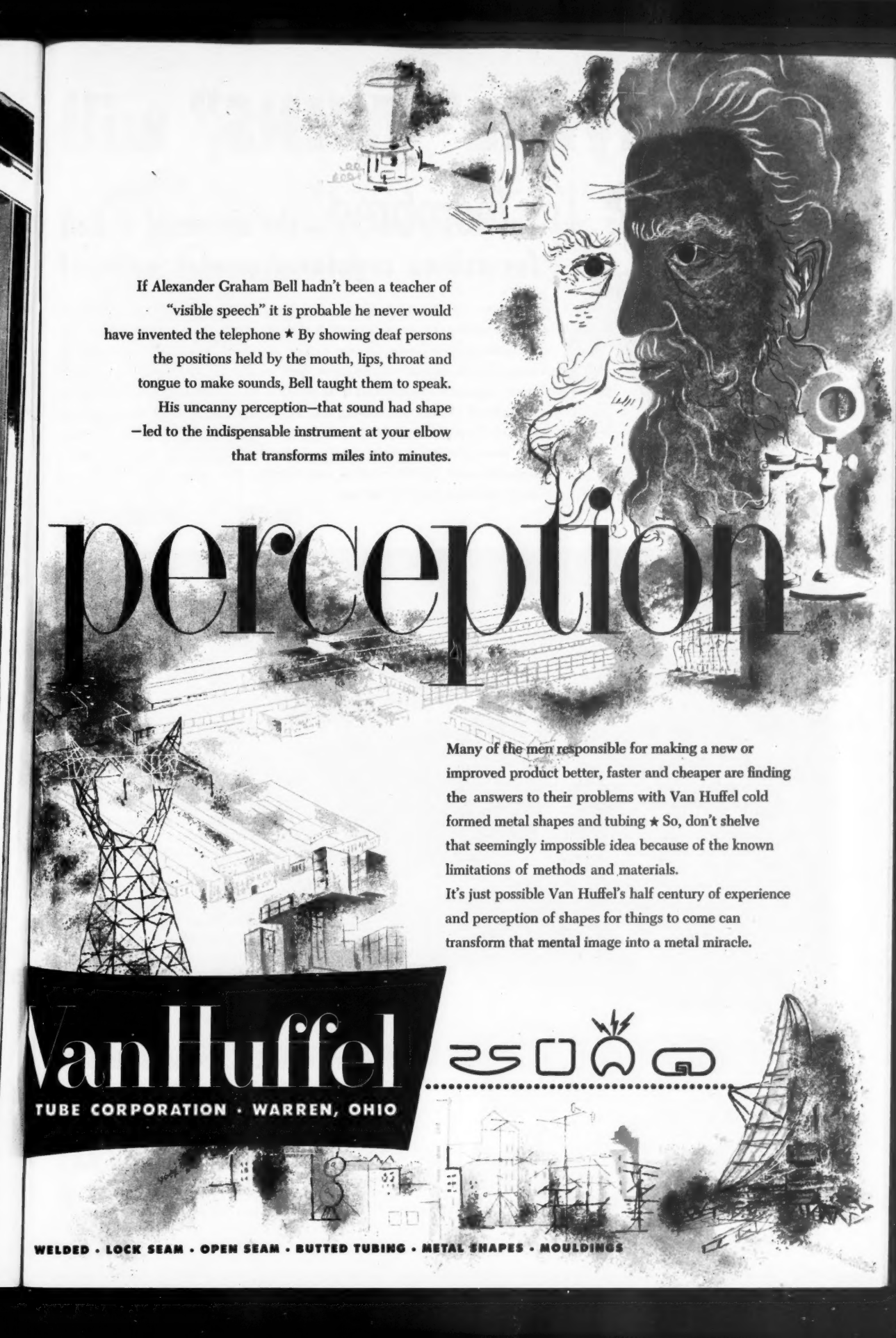
Power Shovels • Crawler and Truck Cranes • Overhead Cranes
Hoists • Arc Welders and Electrodes • Soil Stabilizers
Diesel Engines • Pre-Fabricated Homes



If Alexander Graham Bell hadn't been a teacher of "visible speech" it is probable he never would have invented the telephone ★ By showing deaf persons the positions held by the mouth, lips, throat and tongue to make sounds, Bell taught them to speak. His uncanny perception—that sound had shape—led to the indispensable instrument at your elbow that transforms miles into minutes.

perception

Many of the men responsible for making a new or improved product better, faster and cheaper are finding the answers to their problems with Van Huffel cold formed metal shapes and tubing ★ So, don't shelve that seemingly impossible idea because of the known limitations of methods and materials.

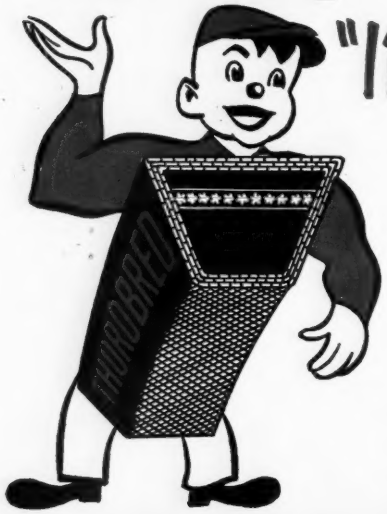
It's just possible Van Huffel's half century of experience and perception of shapes for things to come can transform that mental image into a metal miracle.

Van Huffel

TUBE CORPORATION · WARREN, OHIO

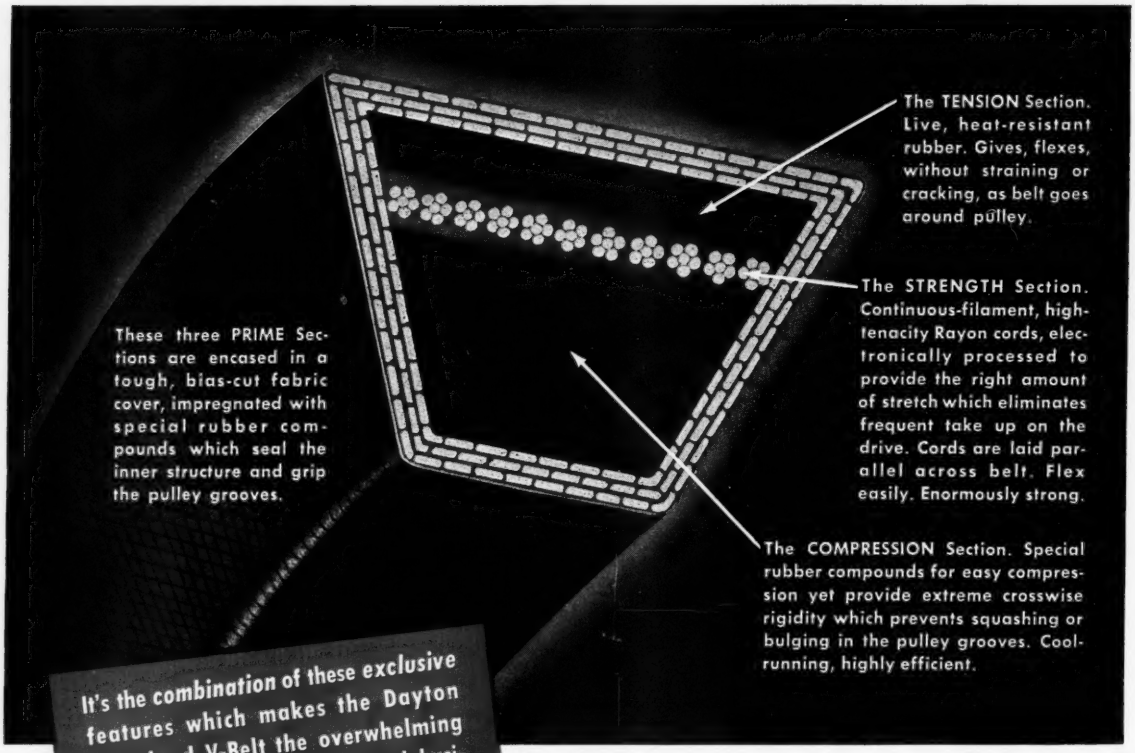
WELDED · LOCK SEAM · OPEN SEAM · BUTTED TUBING · METAL SHAPES · MOULDINGS

The Dayton "TWINS" will



"I'm Thorobred"—the universal V-Belt for use on regular-diameter pulleys!

Cut costs? Yes, you'll *slash* them if you use Dayton Thorobred V-Belts for *all* of your regular power drives! You'll cut your power costs because you'll get *more* of the power on the driven machine! You'll cut V-Belt maintenance expense and at the same time *reduce* costly "downtime!" And most important of all—your V-Belt dollar will go farther because Dayton Thorobred V-Belts last longer, *much longer!* You'll get all these benefits because Dayton Thorobred V-Belts, made by the *originator* of V-Belts, are more *flexible,* much *stronger,* more *stretch-proof,* and run more smoothly and quietly without overheating. For the reasons WHY, see these *exclusive* Dayton features . . .


The TENSION Section. Live, heat-resistant rubber. Gives, flexes, without straining or cracking, as belt goes around pulley.
The STRENGTH Section. Continuous-filament, high-tenacity Rayon cords, electronically processed to provide the right amount of stretch which eliminates frequent take up on the drive. Cords are laid parallel across belt. Flex easily. Enormously strong.
The COMPRESSION Section. Special rubber compounds for easy compression yet provide extreme crosswise rigidity which prevents squashing or bulging in the pulley grooves. Cool-running, highly efficient.
These three PRIME Sections are encased in a tough, bias-cut fabric cover, impregnated with special rubber compounds which seal the inner structure and grip the pulley grooves.

It's the combination of these exclusive features which makes the Dayton Thorobred V-Belt the overwhelming choice of leading industries and businesses for general purpose power transmission drives . . . for more power in longer service at lower cost! It will give all that to YOU!

© D. R. 1952

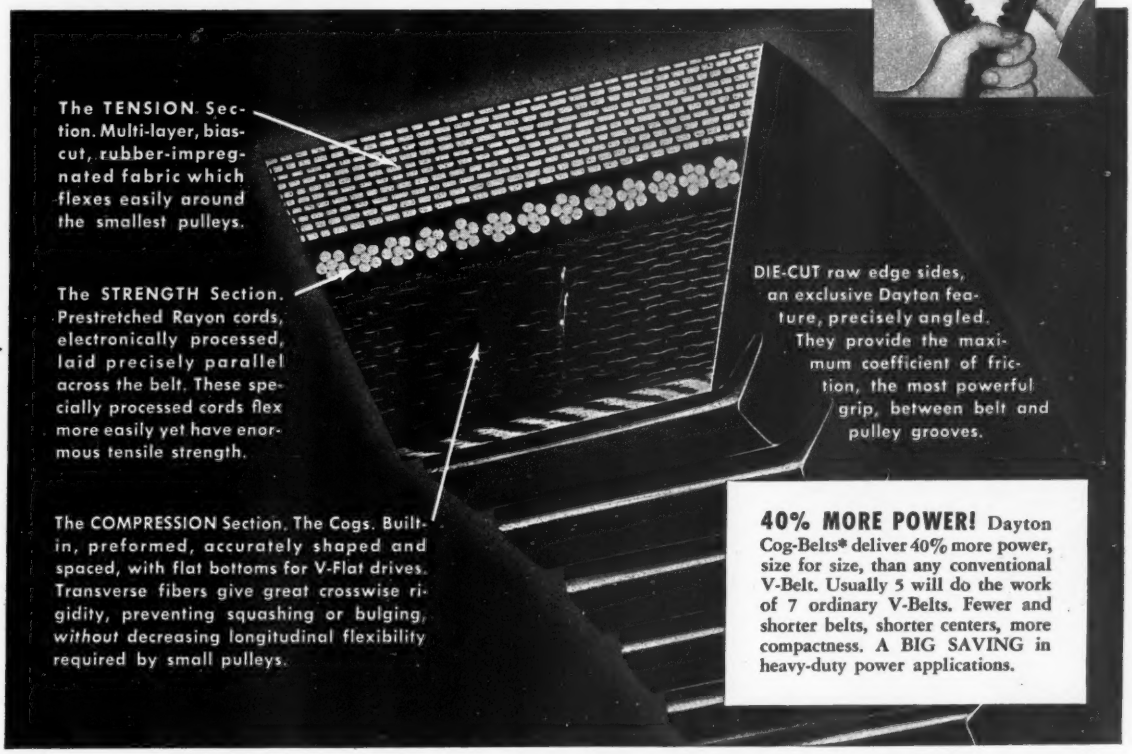
Your choice, between Dayton Thorobred V-Belts and Dayton Cog-Belts,* will ALWAYS depend only on the KIND of power application you need. Either belt will give the BEST results in its proper place. Get in touch with your Dayton Distributor . . . a V-BELT EXPERT! He's listed in your telephone directory under "Belting."

cut your V-BELT costs!

"I'm Cog"—for small pulleys, short centers, high speeds . . . all special power requirements!

You'll slash costs even more with Dayton Cog-Belts!* Specially designed and built for the heavy-duty requirements of high speeds, small pulleys, short centers, compact drives, they deliver 40% MORE POWER than conventional V-Belts. See (right) how a Dayton Cog-Belt* bends as naturally as your finger, how cogs close as the belt bends around the pulley. This greater flexibility demands less power, prevents overheating, *without* sacrificing strength or long life. Look at these *exclusive* features which assure much better service from Dayton Cog-Belts* . . .

*T. M.


The TENSION Section. Multi-layer, bias-cut, rubber-impregnated fabric which flexes easily around the smallest pulleys.
The STRENGTH Section. Prestretched Rayon cords, electronically processed, laid precisely parallel across the belt. These specially processed cords flex more easily yet have enormous tensile strength.
The COMPRESSION Section. The Cogs. Built-in, preformed, accurately shaped and spaced, with flat bottoms for V-Flat drives. Transverse fibers give great crosswise rigidity, preventing squashing or bulging, *without* decreasing longitudinal flexibility required by small pulleys.
DIE-CUT raw edge sides, an exclusive Dayton feature, precisely angled. They provide the maximum coefficient of friction, the most powerful grip, between belt and pulley grooves.
40% MORE POWER! Dayton Cog-Belts* deliver 40% more power, size for size, than any conventional V-Belt. Usually 5 will do the work of 7 ordinary V-Belts. Fewer and shorter belts, shorter centers, more compactness. A BIG SAVING in heavy-duty power applications.

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

V-Belts by **Dayton Rubber**

Since 1905

WORLD'S LARGEST MANUFACTURER OF V-BELTS

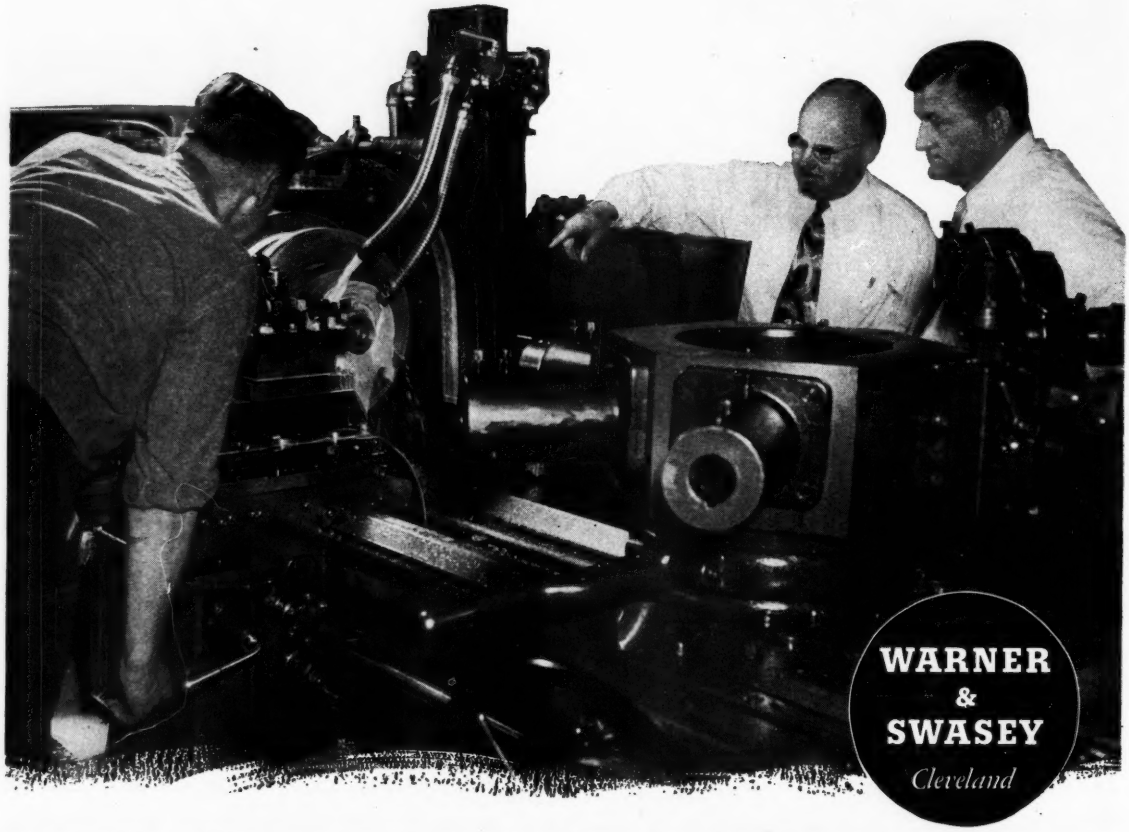
Skilled help for your defense work is available!

● Today we can't offer immediate delivery on new machine tools. But we do offer skilled help—our 45 Warner & Swasey Field Engineers.

If yours is a typical metalworking plant—with machines averaging 10 or more years of age—chances are you need this help to increase the productivity of your machines.

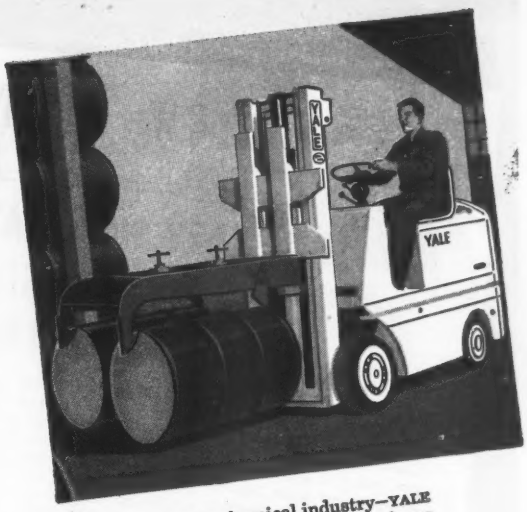
Perhaps one of our Field Engineers can help you. His suggestions may be surprisingly simple—a new part, a different tool, an easy-to-make adjustment. But when he leaves your plant, your machines undoubtedly will be producing more than when he came in.

This is not a war-born service. The Warner & Swasey man who calls on you was *trained* for this job. He has helped increase production in hundreds of plants. His service is typical of Warner & Swasey's long-standing policy of putting the customer *first*—of working with each customer individually to best serve his particular requirements.

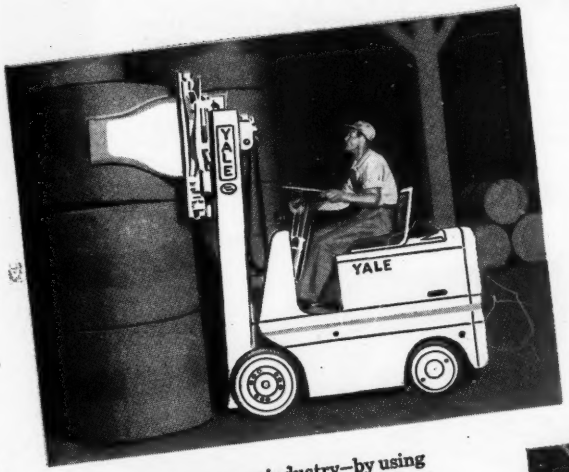


YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

Isn't it time Your business enjoyed these savings, too?



SAVINGS to the chemical industry—YALE Gas Trucks move drums and carboys gently, smoothly, safely. They speed handling, reduce breakage, prevent accidents.



SAVINGS to the paper industry—by using YALE Gas Trucks to handle bulky paper rolls, users are able to free more of their manpower for productive assignments.

SAVINGS to stevedore operations—YALE Gas Trucks' extra powerful, cooler-running engine adds more continuous performance to their fast, high, safe lifting ability.

Exclusive YALE Gas Truck Features Cut Materials Handling Costs... and Maintenance Costs, too

• Time lost in bringing YALE Gas Truck Savings to your business is *money* lost. For YALE Gas Trucks can cut up to 75% off your materials handling costs... save even more in reduced maintenance costs and production stoppages.

Find out now how YALE Gas Trucks' exclusive features reduce your bills for breakdown and wear in transmission, drive, steering assembly—every working part of the truck. Call your YALE Representative—or mail the coupon today.

YALE is a registered trade mark of The Yale & Towne Manufacturing Co.

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The Yale & Towne Mfg. Co., Dept. 85
Roosevelt Blvd. & Haldeman Ave., Phila. 15, Pa.

How can YALE Industrial Gas Trucks do more—save more—for me?
( ) Please have your local representative call
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In Canada write: The Yale & Towne Manufacturing Co., St. Catharines, Ont.

YALE ELECTRIC INDUSTRIAL TRUCKS • YALE *WORKSAVERS* • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

Built & Sold by Waterbury-Farrel In The United States Of America And Canada Only.

SCREW SLOTTING NEWS

REVOLUTIONARY, NEW WATERBURY-FARREL MACHINE SLOTS 500 TO 2000 FINISHED BLANKS PER MINUTE

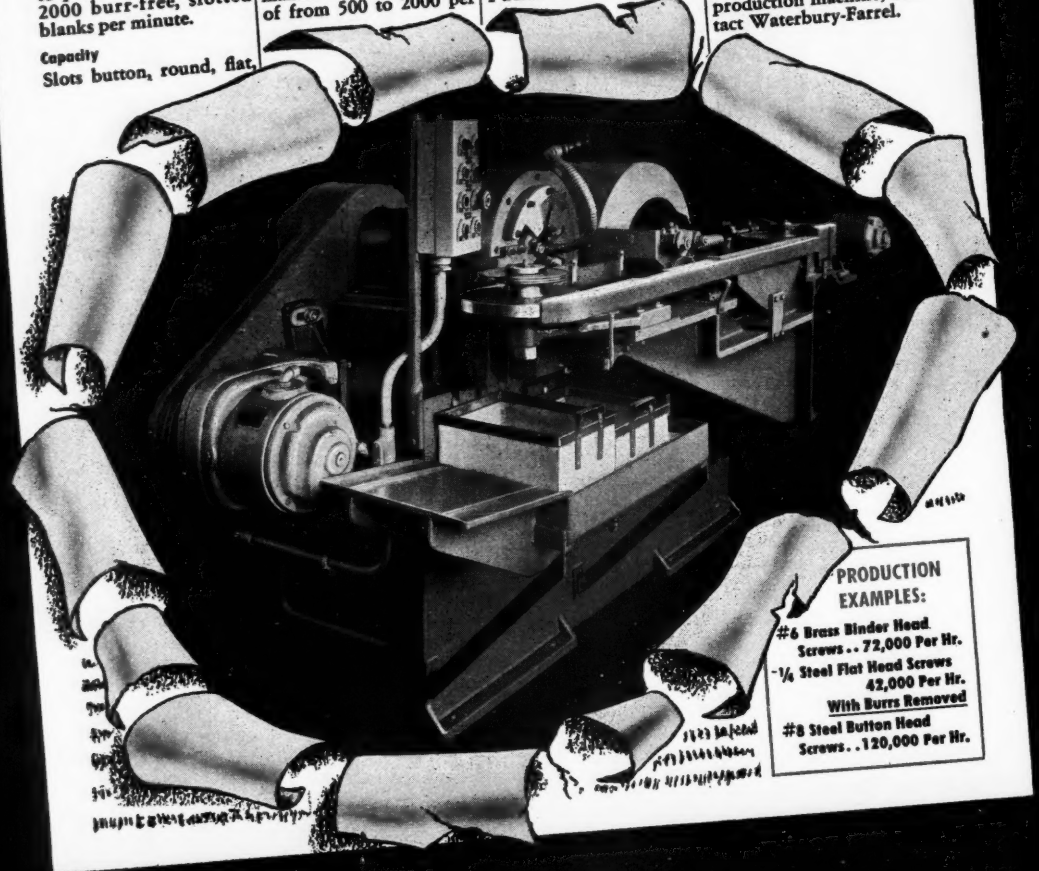
Unprecedented Saw Life Per Grind

This new Waterbury-Farrel #1 High Speed Screw Head Slotting Machine uses only one hopper, one dial and one saw to pour out from 500 to 2000 burr-free, slotted blanks per minute.

Capacity
Slots button, round, flat, flat oval, fillister, truss or binder heads (of brass or standard lower carbon machine steel), in sizes from #6 by ¼" minimum length to ¼ by 3" overall maximum length. Speeds of from 500 to 2000 per min. depend upon shape and size of head and whether steel or brass is used.

Fully Electrically Driven . . . Lubrication Safety Interlocked
Panel board control switches are safety interlocked so that oil flow must be started first. Then the saw, dial and feed are each started in that order by separate switches.

For further information on this outstanding new production machine, contact Waterbury-Farrel.



PRODUCTION EXAMPLES:
#6 Brass Binder Head Screws . . 72,000 Per Hr.
-¼ Steel Flat Head Screws With Burrs Removed 42,000 Per Hr.
#8 Steel Button Head Screws . . 120,000 Per Hr.

WATERBURY-FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.
Offices: Chicago, Cleveland and Millburn, N. J.

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY-FARREL • *COLD PROCESS BOLT AND NUT MACHINERY*—Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters Nut Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Multiple Plunger Presses • Hydraulic Presses, etc. *MILL MACHINERY*—Rolling Mills • Wire Flattening Mills • Chain Draw Benches • Slitters and various accessory mill machinery. *WIRE MILL EQUIPMENT*—Continuous Fine Wire Drawing Machines (Upright Cone and Tandem) • Bull Blocks • String-up Machines • Spoolers, etc.

FOUNDED WATERBURY FARREL 1851

WF-5

How would you solve it?

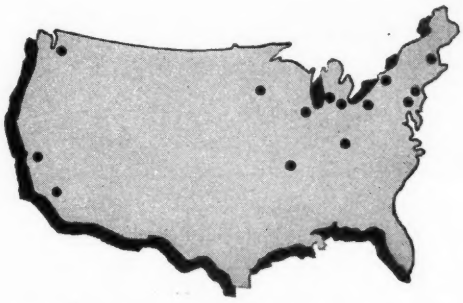
Production Problem:

Grind and finish shotgun barrels in one high-speed operation

1 Winchester Repeating Arms Co., New Haven, Conn., turned this grinding and finishing problem over to a 3M Methods Engineer who used his wide knowledge of coated abrasive applications, and came up with a solution.

2 His answer to this problem was a conversion to backstand equipment with fast-cutting abrasive belts. A backstand idler was also recommended—plus the correct abrasive belt, proper grit size and most efficient operating speed.

3 Now Winchester uses the 3M Method to rough grind and finish shotgun barrels more than twice as fast as with their previous method of using set-up wheels—with smoother finishes, too!



4 3M Methods Engineers, in demonstration rooms throughout the country, are ready to help *you* cut grinding and finishing costs. For more information and a copy of "Step Up Production," write: 3M, Dept. ST52, St. Paul 6, Minnesota.

3M® ABRASIVE BELTS

Made in U.S.A. by **MINNESOTA MINING & MFG. CO.**, St. Paul 6, Minn. —also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: 270 Park Avenue, New York 17, N. Y. In Canada: London, Ont., Can.

WEIRTON
STRIP STEEL

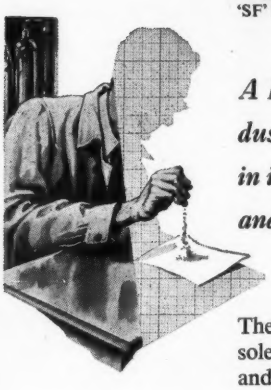
The better the strip, the better the product—and the easier production. Those are two important reasons why manufacturers find it advantageous to use Weirton cold-rolled strip steel. Its excellent drawing and forming qualities, its constant uniformity, promote plant efficiency and economy by reducing spoilage and tool expense. In short—Weirton strip boosts both quantity and quality.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

Fly-ash collection can pay its own way

'SF' Electric Precipitator collecting nuisance dust in a foundry.



A Buell industrial 'dust' man can show you how dust collection pays off in improved product, higher employee morale and better community relations

The Buell organization of industrial 'dust' men is devoted solely to the design and construction of dust recovery and dust collection equipment that will most efficiently and economically solve your plant's specific stack dust problem.

For more than 18 years we have been doing just this for all American industry. Every Buell installation is a custom designed system, engineered to hold stack dust discharge down to the practical limits which assure new profits, improved product and/or process, better plant-community relations, higher levels of employee morale.

For full information about Buell's ***3 basic systems*** of dust collection, and how one can be applied to the solution of your stack dust problems, write today. Ask for the new informative bulletin titled, "The Collection and Recovery of Industrial Dusts." Do it now. Buell Engineering Co., Dept. 26E, 70 Pine Street, New York 5, N. Y.

ELECTRIC CYCLONIC

HIGH EFFICIENCY CYCLONES • ELECTRIC PRECIPITATORS
TYPE 'LR' COLLECTORS • LOW DRAFT LOSS COLLECTORS
SPECIAL PURPOSE COLLECTORS • DUST HOPPER VALVES

buell

ENGINEERED EFFICIENCY IN DUST COLLECTION

Do you really know you couldn't do

Only CARBO

TRADE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, New York

it faster with an abrasive DISC?

A healthy skepticism is the profitable approach for you to take, nowadays, to every abrasive operation in your shop. The difference between a bad and a good profit factor can often be a new improvement in grinding, and new developments in this field are piling up daily under the crucial necessity of cutting costs without cutting corners.

If there's a faster, better way to perform any grinding or polishing operation, your CARBORUNDUM or distributor salesman is one man who's sure to know about it. Through him, and with his unbiased help, you can change your operating methods, if that seems indicated. Or you can change the abrasive you're using. Or both, or neither. The point is...both you and he are operating on *your* side of the desk—primarily for your profit, incidentally for his...not the other way round.

That's what comes of working with the man who represents the only complete line of branded abrasives, unsurpassed in scope, unexcelled in quality. So, today—call in the man from CARBORUNDUM: it's to your profit!

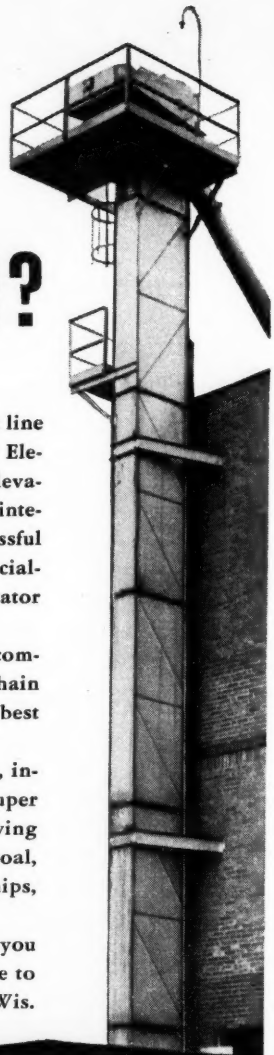
Here are only a few of the 30,000 reasons why you get the RIGHT combination of abrasive and method only from CARBORUNDUM

RUNDUM

MARK

offers ALL abrasive products...to give you the proper ONE

looking for a BUCKET ELEVATOR?



They're easy to find—when you make the complete Chain Belt line your starting point. Here, you'll find a standard Rex® Bucket Elevator to meet virtually every type of requirement. You'll find elevators that are dependable, long lived, that require very little maintenance. You'll find a design that has been proved by years of successful operation in almost every industry. And you'll find trained specialists—men who devote themselves exclusively to bucket elevator problems—ready, willing and able to help you all they can.

Remember, too, that in a Rex Bucket Elevator all the major components—buckets, chains, sprockets, housing—are made by Chain Belt Company . . . just one more reason why you're sure of the best when you specify Rex.

Rex Bucket Elevators are made in a wide variety of designs, including Centrifugal Discharge type, Continuous Bucket type, Super Capacity type. They can handle virtually every type of free flowing material. Here's a list of some of the most commonly handled: coal, cement, gravel, crushed limestone, salt, sand, sugar, wood chips, soda ash, pebble lime, foundry sand.

Your Rex Field Sales Engineer is well qualified to advise you about the best elevator for your needs. Call him today or write to Chain Belt Company, 4660 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY ®

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DoALL
BAND MACHINES
BAND TOOLS
GAGE BLOCKS
SURFACE GRINDERS
PRODUCTION NEWS
SAW BANDS • GAGING EQUIPMENT • TOOL STEEL • CUTTING TOOLS • INDUSTRIAL SUPPLIES

Vol. 1 Published by The DoALL Company, 254 N. Laurel Ave., Des Plaines, Illinois No. 5

DoALL Bench Filer Can Speed Up Die Making

No Hand Filing Required; Speed is Infinitely Variable from 170 to 470 Strokes per Minute; File Can be Aligned in 10 Seconds

Toolmakers who have used a DoALL Bench Filer usually name three primary reasons for its ability to turn out accurate work faster than it can be done by other methods:

1. The file can be set perfectly straight in the machine in about 10 seconds;

2. The accuracy of the machine eliminates any need for touching up the piece with a hand file; and,

3. The speed range is infinitely variable (not stepped) so that the best speed for tool life and desired finish can be secured on any job.

A patented universal-joint file clamp compensates for any irregularities in the file shank. A file setting square is provided with the machine to line the file up perfectly before clamping it tightly in position. There is no wobble in the filing action, making possible perfect accuracy of cut.

The Bench Filer is equipped with a DoALL Speedmaster variable speed pulley, adjustable by hand crank to any desired tool stroke speed.

The machine also includes an easily adjustable tilting table, instantaneous vertical bearing adjustment, magnifying lens for easier view of close work (extra) and an air jet nozzle for blowing away filings from the point of work.

In addition to filing, the machine can be used for sawing and honing with a few accessory pieces.

The price is only $215. Literature is available upon request.

Band Machine Gives this Monster Its Sharp Teeth for Big Bites

Hanna Coal Company Keeps Stripping Shovel in Digging Trim with Versatile DoALL MP-20

The cab is bigger than a house, the boom looks like the Eiffel Tower and you can almost lose a truck in the dipper of the big stripping shovel pictured here.

Keeping this machine on the job for its owner, Hanna Coal Company, is a major responsibility of a DoALL MP-20 Contour-matic Band Machine. When a dipper tooth base needs replacement, the MP-20 cuts a new one. When it strips a gear, the DoALL machine saws a new one out of alloy steel.

The Contour-matic machine is an all-around performer wherever a variety of sawing, slicing, grinding, filing, honing or polishing jobs must be done. It's speed range is 40 to 10,000 blade feet per minute. It will handle every DoALL band tool made for cutting every material. Its hydraulic controls make it easier to operate, and faster.

A free demonstration of the Contour-matic can be arranged at any plant requesting it.

DoALL Hand Files Available Immediately To Meet Local Shortages

In order to help meet the current unbalance of hand file distribution throughout the country, DoALL is now making the most widely used types available immediately to any section of the country. Where local stocks prove temporarily inadequate, most orders can be promptly filled from DoALL central warehouse stocks. Delivery is free regardless of quantity ordered.

Seeing is Believing

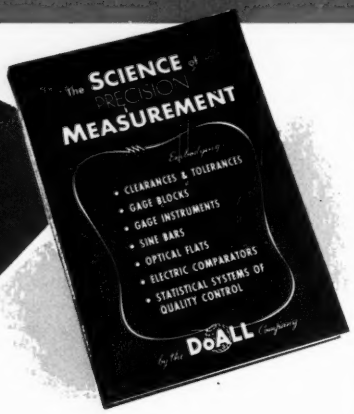
Because it is not always possible for a buyer to evaluate the possibilities of a product without witnessing its performance, DoALL offers free demonstrations of any DoALL product at any plant. No obligation is entailed in requesting such a demonstration.

----See Next Page-->

NOW A COMPLETE SYSTEM FOR D

To Reduce Rejects and Waste of M

1. A Complete Text on "The Science of Precision Measurement"



HERE is a new 256 page textbook that contains complete information on the theory and use of Gage Blocks, Optical Flats, Monolites, Electric Comparator Gages and related equipment for dimensional measurement; explains the "reading" of millionths-of-an-inch measurement with light wave interference bands; shows why such accuracy is necessary to control thousandths-inch production tolerances; tells recommended procedures for statistical sampling of parts for dimensional control, that will show you how to reduce rejects and waste. No other single publication treats these subjects in so comprehensive a manner. This $3.50 book is a component part of the DoALL Dimensional Quality Control System and a guide to maximum benefit from use of Gaging Equipment. To secure a copy call your local DoALL Sales-Service Store or write direct.

2. An Outstanding Line of Precision Measuring Equipment

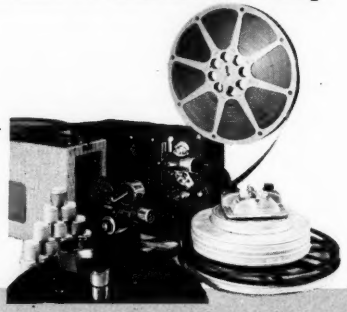
DoALL BLOCKS

There are 15 standard sets of DoALL BLOCKS from a 6-piece set for checking micrometers to a 118-piece Master Gage Set. No finer Gage Blocks are manufactured anywhere in the world. All are guaranteed to equal or surpass National Bureau of Standards recommendations for dimension, flatness, parallelism, finish and hardness. A complete line of accessories enables you to use DoALL BLOCKS for checking dimensions of any conceivable part, tool or gage. Ask for your free copy of "Modern Measurement Control"—a 24 page Catalog describing the features and uses of DoALL BLOCKS and accessories.

3. A Practical Service Program

DEMONSTRATION — DoALL Service starts with a demonstration of DoALL Gaging Equipment right in your plant.

TRAINING MATERIALS — Explanatory texts and films available on the theory, use of and care of gaging equipment. DoALL Sales-Service men are at your service at all times for consultation and help.



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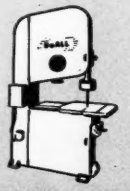
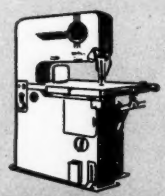
CONTOUR-MATIC



ZERMYR



CONTOUR

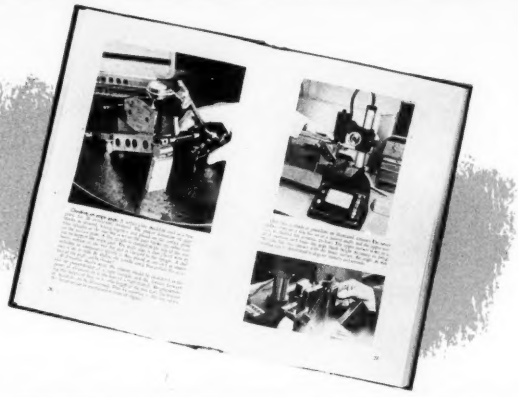
BAND FILER

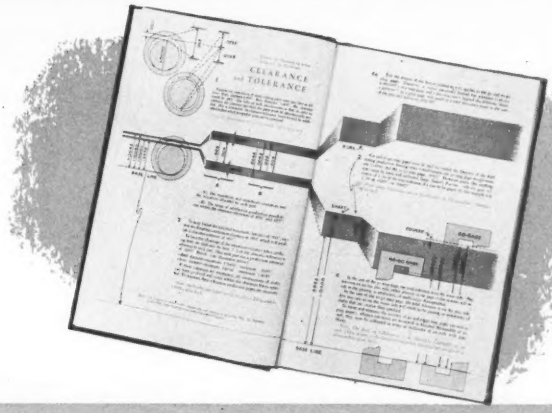
MONOLITE

SAW BANDS

DIMENSIONAL QUALITY CONTROL

Manhours, Metals and Money





DoALL MOBILE INSPECTION UNIT

A unique unit which permits on-the-spot inspection of working gages right at the machine—a system that saves man-hours, reduces faulty work, lengthens gage life, simplifies control and prevents mix up of gages from different points in the plant.

DoALL OPTICAL FLATS

Highest quality quartz, precision Optical Flats for "reading" millionths-of-an-inch with light wave interference bands. Both circular and square types available. Complete range of sizes up to 14-inch diameter.

DoALL MONOLITE

Another DoALL development in pioneering light wave measurement equipment—a new high intensity helium light source for inspecting dimensions or surfaces through Optical Flats for millionths-of-an-inch variation. Many improvements over previous model. Ask for bulletin.

GAGE BLOCK CALIBRATION SERVICE—Just as you periodically check the finest watch against a master standard, so must you periodically check the accuracy of finest lineal measurement instruments — Gage Blocks — against the ultimate constant—a wavelength of light. DoALL offers this service at a nominal charge for any make of block. Ask for details.

Call your local DoALL Sales-Service Store

or write

THE DoALL COMPANY

254 N. Laurel Ave., Des Plaines, Illinois

DoALL

35 Sales-Service Stores in Principal Cities

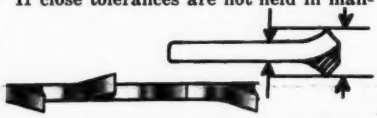
TOOL STEEL

Accuracy of Saw Set a Critical Factor in Band Sawing Efficiency

DoALL Quality Control Program Insures Precision Set Tolerances

Set of saw teeth is defined as: "the amount of displacement or offset given each tooth to create side clearance for the back of the saw band when cutting through a material." In manufacturing DoALL saw bands, set is held uniform to a tolerance of plus or minus .0015", with symmetry of set held within .0005". If close tolerances are not held in manufacturing saw bands one or more of the following difficulties can arise:

Checking DoALL saw set tolerance with an optical comparator.



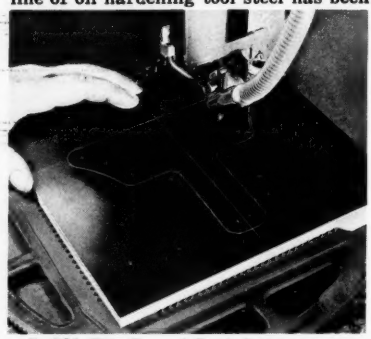
Set is the amount of bend given the teeth to provide clearance for the back of the saw band.

1. Unsatisfactory finish.
2. Failure of band to cut as sharp a radius as that for which it is designed.
3. Tendency of band to lead right or left, spoiling straight cuts.
4. Binding of band in cut.
5. Dimensional inaccuracy of kerf in slotting applications.
6. Excessive heat generation.
7. Failure to cut at maximum rate.

Among the 83 separate inspections of DoALL Saw Bands during manufacture, several are devoted exclusively to checking the accuracy of saw set. Any variation, no matter how minor, from DoALL's exacting set tolerances is cause for a band to be rejected. Such quality control standards assure the DoALL saw band user of maximum sawing efficiency and permit the DoALL guarantee of "complete satisfaction as to quality or replacement at no cost".

DoALL Enlarges Number of Ground Flat Stock Standard Sizes to Over 230

In order to minimize waste in cutting dies, punches, tools and parts from precision ground flat stock, the DoALL line of oil hardening tool steel has been increased to 238 standard sizes ranging from $\frac{1}{64}$" to $1\frac{1}{2}$" thickness and $\frac{3}{16}$" to 14" widths in 18" and 36" lengths. This makes it possible for a user to select the size most closely suited to any given requirement. These sizes are carried in stock. Special sizes can usually be supplied on short notice. Literature and prices available upon request.



DoALL Flat Ground Stock being cut accurate to layout with a DoALL Band Machine.

CALL DoALL locally at these Sales-Service Stores

Note: These New DoALL STORES in Expansion Program for BETTER SERVICE*

*ATLANTA, GA.
304 Decatur St., S.E.
Call DoALL: Walnut 5384

BALTIMORE 12, MD.
5621 York Rd.
Call DoALL: Hopkins 5340

BIRMINGHAM 4, ALA.
800 N. 24th St.
Call DoALL: Birmingham 3-0502

BROOKLINE 46, MASS.
89 Washington St.
Call DoALL: Longwood 6-9555

*BUFFALO 23, N. Y.
1063 Kenmore Ave.
Call DoALL: Riverside 3424

CEDAR RAPIDS, IOWA
624 Fifth St., S.E.
Call DoALL: Cedar Rapids 3-0616

CHARLOTTE 2, N. C.
405 S. Mint St.
Call DoALL: Charlotte 4-2579

CHICAGO 39, ILL.
4650 W. Fullerton Ave.
Call DoALL: Albany 2-5300

CINCINNATI 2, OHIO
536 Sycamore St.
Call DoALL: Main 3929

CLEVELAND 3, OHIO
6517 Euclid Ave.
Call DoALL: Express 1-1177

DALLAS 2, TEXAS
1628 Industrial Blvd.
Call DoALL: Sterling 3819

DAYTON, OHIO
725 S. Main St.
Call DoALL: Michigan 2121

DENVER 4, COLO.
1187 Stout St.
Call DoALL: Alpine 7444

DETROIT 27, MICH.
15010 Plymouth Rd.
Call DoALL: Broadway 3-4141

GRAND RAPIDS 7, MICH.
410 Hall St., S.E.
Call DoALL: 5-2191

HARTFORD 5, CONN.
45 Farmington Ave.
Call DoALL: Hartford 5-6664

HOUSTON 2, TEXAS
121 St. Emanuel
Call DoALL: Capital 6588

INDIANAPOLIS 2, IND.
1401-3 N. Illinois St.
Call DoALL: Plaza 6496

JACKSONVILLE 7, FLA.
1106 Kings Ave.
Call DoALL: Jacksonville 9-7087

KANSAS CITY 6, MO.
1019 E. Truman Rd.
Call DoALL: Harrison 5857

LOS ANGELES 21, CALIF.
1316-18 S. Santa Fe
Call DoALL: Trinity 3871

MILWAUKEE 5, WIS.
2427 W. North Ave.
Call DoALL: Division 2-2950

MINNEAPOLIS 14, MINN.
1328 S. Fourth St.
Call DoALL: Atlantic 4341
St. Paul—dial red "O" for Zenith 2399

*NASHVILLE, TENN.
1923 Church St.
Call DoALL: 42-0605

NEW YORK 10, N. Y.
67 Lexington Ave.
Call DoALL: Murray Hill 4-1514

NUTLEY 10, N. J.
88 Park Ave.
Call DoALL: Nutley 2-6767

PHILADELPHIA 24, PENNA.
2053 E. Glenwood Ave.
Call DoALL: Cumberland 8-7400

PITTSBURGH 21, PENNA.
600 Rebecca Ave.
Call DoALL: Fremont 1-5200

ROCHESTER 5, N. Y.
215 Central Ave.
Call DoALL: Hamilton 8420

ROCKFORD, ILL.
123 Seventh St.
Call DoALL: Rockford 47848

SAN FRANCISCO 3, CALIF.
952 Howard St.
Call DoALL: Garfield 1-4784

SEATTLE 22, WASH.
520 E. Pike St.
Call DoALL: East 7500

ST. LOUIS 6, MO.
1945 N. Broadway
Call DoALL: Central 3620

TOLEDO 6, OHIO
2952 Monroe St.
Call DoALL: Garfield 8309

TULSA, OKLA.
207 W. Archer St.
Call DoALL: 35443

MONTREAL, QUEBEC, CANADA
583 Inspector St.
Call DoALL: University 1264

TORONTO 10, ONTARIO, CANADA
37 Clarkson Ave.
Call DoALL: Redfern 4238

MEXICO CITY, D. F., MEXICO
Maestro Antonia Casso #48
Call DoALL: Mexicana 36-27-95
or Ericcson 18-63-74

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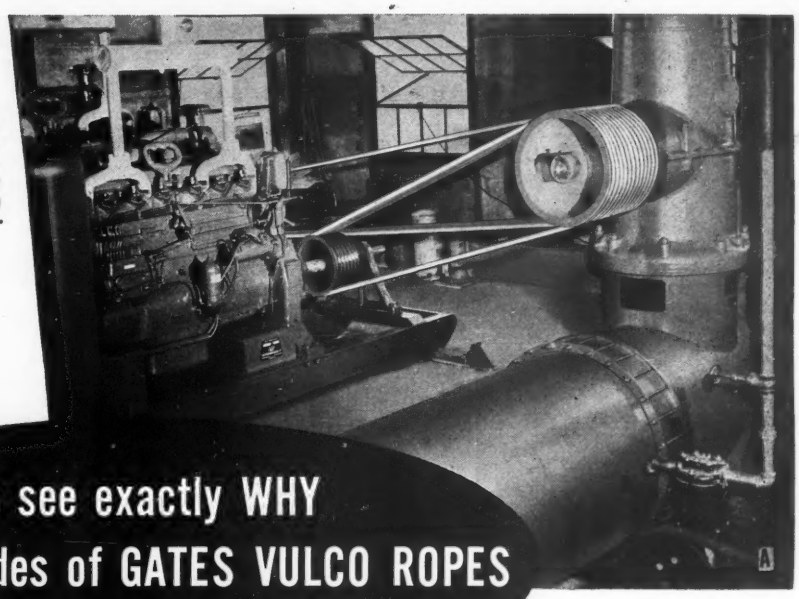


To drive one of the new high capacity pumps which removes surface water and runoff from 15,000 acres of Illinois farmland, members of the District Board chose Gates Vulco Ropes, running from two diesel units.

Let's see exactly WHY the Concave Sides of GATES VULCO ROPES mean lower V-Belt Costs!

Every engineer knows how a V-belt *changes shape* when it bends around a pulley.

The top of the belt is under tension—making it grow *narrower.*

The body is under *compression,* causing the sides to bulge out!

Look at figure 1-A in the diagrams, herewith. There you see how a *straight sided* V-belt is forced to bulge in its sheave-groove—and this bulging naturally causes extra wear along the middle of the sides as indicated by the arrows.

Now look at the figure 2-A. There you see how the precisely engineered Concave Sides fill out to an exact fit in the sheave groove.

Clearly, the Concave Sides press *evenly* against the V-pulley. This means uniform wear; longer life! The Concave Sides have *full traction;* wear longer because of *full contact!*

To sum up: The Concave Sides of Gates Vulco Ropes (U.S. Patent No. 1813698) give you (1) Less wear, (2) More pulley contact, (3) More sure power transmitted when needed!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends

Straight-Sided V-Belt

Fig 1

Fig. 1-A

How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

Gates Vulco Rope with Concave Sides

Fig. 2

Fig. 2-A

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-521

Gates®

Hose V-Belts
Molded Rubber Goods
for Industry

World's Largest Maker of V-Belts

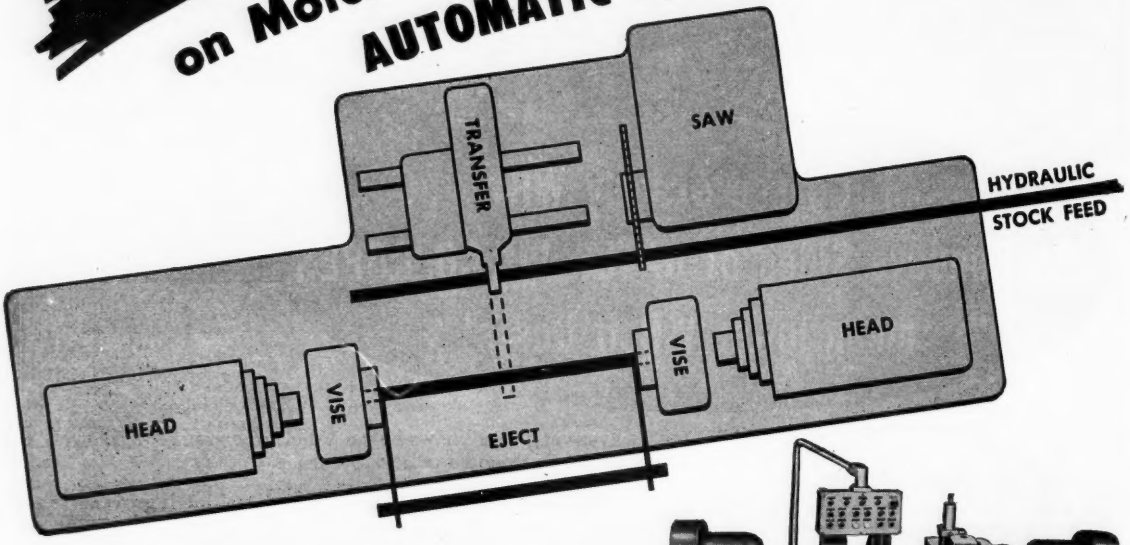
VULCO® ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

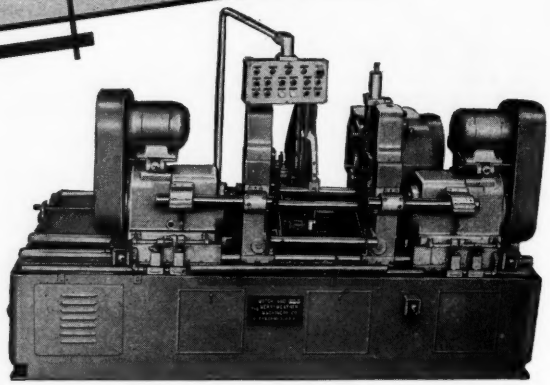
THE GATES RUBBER COMPANY • DENVER • U•S•A

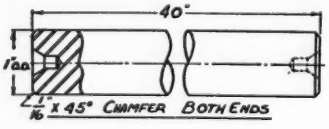
It's "Operation Combine"

on Motch & Merryweather AUTOMATIC TRANSFER MACHINES!

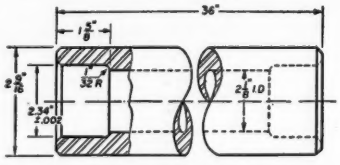


Machine both ends simultaneously and get the cut-off time free on Motch & Merryweather Automatic Transfer Machines. Save time, floor space and money. Get the details on your jobs! No obligation.

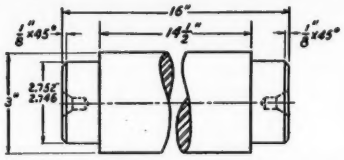




Operation: Cut off, chamfer and center drill both ends.
Material: SAE 1040 ground shafting.
Production: 240 pcs/hr.



Operation: Cut off; bore and chamfer inside and outside, both ends.
Material: SAE 1020 steel tubing.
Production: 140 pcs/hr. @ 100% eff.

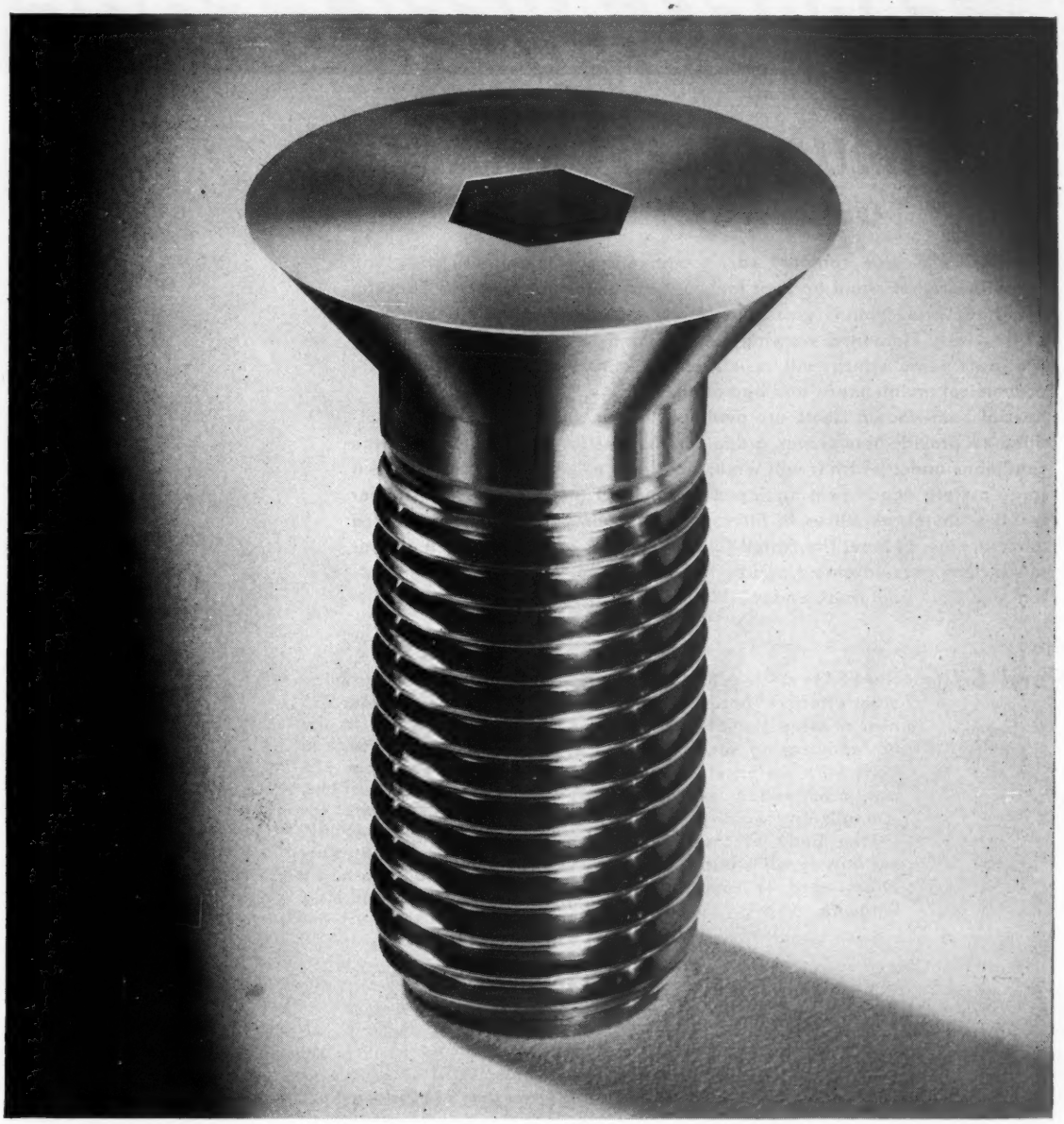


Operation: Cut off, box mill, turn and center drill both ends.
Material: SAE 1020.
Production: 140 pcs/hr.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT



For assembling THIN-SECTION MATERIALS

UNBRAKO FLAT HEAD SOCKET CAP SCREWS

Precision made to Class 3 fit, these UNBRAKO screws have maximum head contact, flush surface assembly, non-slip internal wrenching, high shear and tensile strength. Write for descriptive literature. STANDARD PRESSED STEEL Co., Jenkintown 33, Pennsylvania.

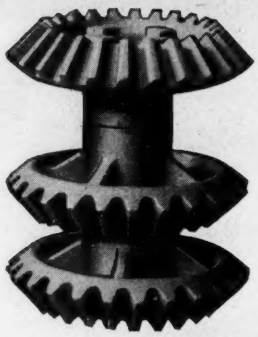
Standard sizes, #4 to ¾" inclusive, are available from your UNBRAKO distributor's stocks. Ask him about deliveries, you'll like what you hear.

SPS JENKINTOWN, PENNSYLVANIA

UNBRAKO SOCKET SCREW DIVISION CAP SCREWS • SET SCREWS • SHOULDER SCREWS • DOWEL PINS • PRESSURE PLUGS

FARRELL-CHEEK GEARS

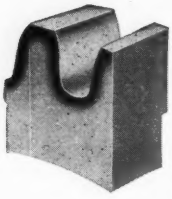
MAXIMUM PERFORMANCE and ECONOMY



Farrell-Cheek "true contour" cast tooth gears are designed, cast, and manufactured to stand up over long periods under heavy loads. Exacting standards and controls give superb wearing qualities with a minimum of backlash. Hardened wearing surfaces and tough cores provide fine, precision gears which will resist severe, abrasive wear and promote economical maintenance and operation.

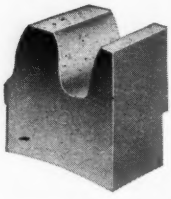
Special heat-treated steels are available in a variety of analyses developed to provide the proper grade for the design of the gear and the conditions under which it will work. Hundreds of patterns in stock, and a large pattern department equipped to construct them quickly from either wood or metal, permit us to fill your specifications with accuracy and a minimum loss of time. The Farrell-Cheek service is complete . . . all of your needs, new or replacement, can be filled from one source . . . design, patterns, casting, heat treat, and machining, in one modern plant.

Hard Edge

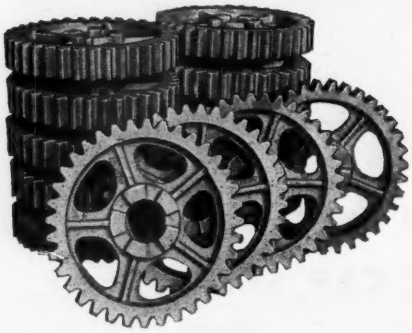


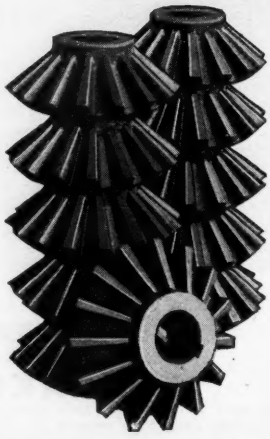
Hard Edge steels provide effective hardness at contact points of toothbearing sections with an excellent combination of strength and rigidity in the body of the castings to withstand stress, and to give long life.

F-85



F-85 steels provide hardness of from 285 to 350 Brinell in the teeth for resistance to wear, and from 185 to 200 in sections, such as hubs, for ready machinability. Scientific heat treatment makes parts rigid, tough, and long lived.





FARRELL - CHEEK STEEL CO.

MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS
FARRELL'S HARD EDGE STEEL CASTINGS
FARRELL'S "85" STEEL CASTINGS

RAILROAD CASTINGS
Locomotive and Car R. R. Specialty Castings.

ELEVATOR, CONVEYOR PARTS
Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers.

BUSHINGS
Carbon and Alloy Steels Machined, Hardened, Ground.

CRANE WHEELS
Overhead, Gantry, Monorail, Ingot Car, Charging Machine.

GEARS AND PINIONS
"True Tooth" Gears and Pinions, Sheaves and Wheels.

SPECIALIZED CASTINGS
Light Section Castings.

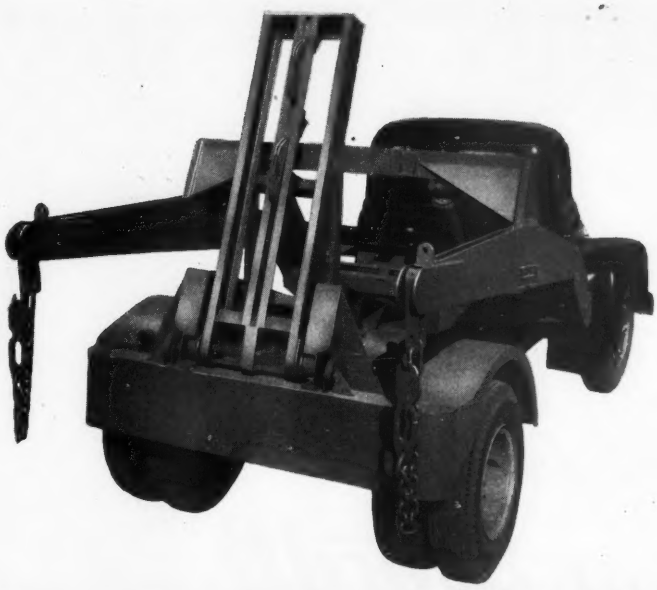
STOKER PARTS
Feed Screws, Furnace Tools, Flanged Pipe, etc.

HEAVY HARDWARE
Wire Rope Fittings, Choker Hooks, Bar Benders, Cutters.

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO U.S.A.

F-85 F-C

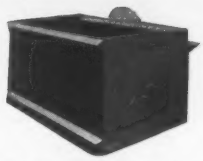


WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

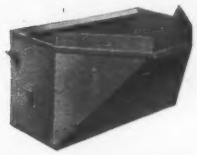
The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

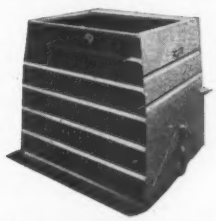


Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.

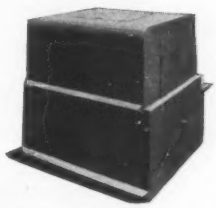
Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.



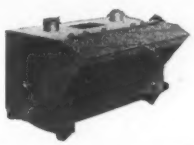
Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.



Universal Type built up to 12 cu. yd. capacity with top and end doors.



Five cu. yd. container with swivel casters for handling waste blast sand.

DEMPSTER BROTHERS, 652 Dempster Bldg., Knoxville 17, Tenn.

...unique Compound Head cuts costs at Wyatt's

This *big* Baldwin plate planer at the Houston plant of Wyatt Metal and Boiler Works is a real cost-cutter with its versatile compound head and quick reversing action. The head can be hand fed through any angle from 30° below to 105° above the horizontal center. The tools have a 10″ horizontal travel and 9″ vertical travel. This combination of large linear travel and angular adjustment enables Wyatt to easily scarf and angle-finish plate edges without removal and turning of plate.

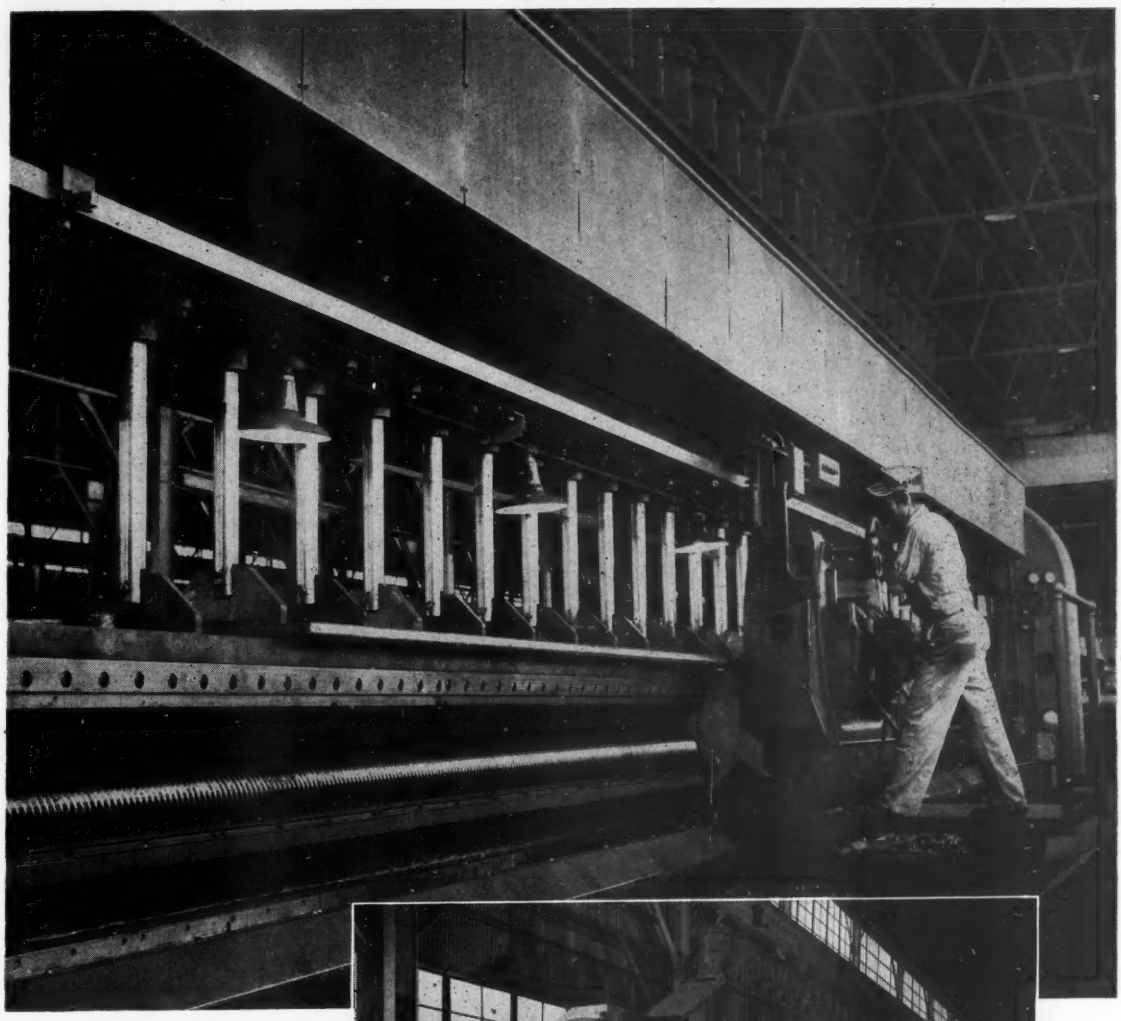
Since its installation, Wyatt has been able to appreciably reduce the time required to bevel steel plate and has made substantial reductions in their production costs.

If you are in the market for either a standard or special plate planer —or any type of mechanical or hydraulic press—contact your nearest Baldwin representative. For more than 100 years we have been designing and building large, close tolerance equipment for the metal working industry. You'll find this experience invaluable in helping you to select equipment that will exactly do your job —and do it with maximum efficiency and satisfaction.

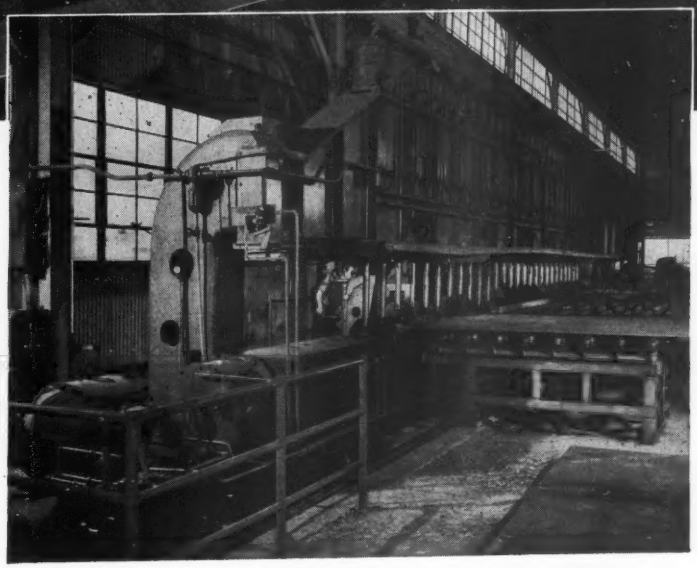
BALDWIN BLH LIMA-HAMILTON

Eddystone Division
BALDWIN-LIMA-HAMILTON CORP.
Philadelphia 42, Pa.
Offices in Principal Cities

BALDWIN - LIMA



63 feet in overall length, this Baldwin planer machines plates up to 40 feet long. Cylinders can be used in groups to minimize air consumption. Maximum clamping pressure is 270,000 pounds.



Speed of carriage is adjustable from 15 feet to 60 feet per minute. Reversing is smooth and easy because of dynamic braking that slows down and reverses motor at the end of each stroke. Solenoids lift toolholders on the back stroke to prevent tool drag.

- HAMILTON

HOLDING A CLOUD-BUSTER'S BREATH

Low pressure breathing oxygen cylinders must be perfect . . . there are no re-fills at 40,000 feet.

Many things can happen at 40,000-plus. But today's precision-trained sound-busters can usually handle them all. But let their vital oxygen supply go wrong and in a matter of seconds there is nothing that can be done.

To meet rigid service specifications, D. K. Manufacturing used Thor-Tung electrodes and Heliwelding. Using both the manual, water-cooled Heliweld holder for welding spuds into position, and the Heliweld Automatic Head for production line runs while welding cylinder halves, D. K. turns out breathing oxygen cylinders which test a leak-free 700 psi—hundreds of pounds above working pressure requirements.

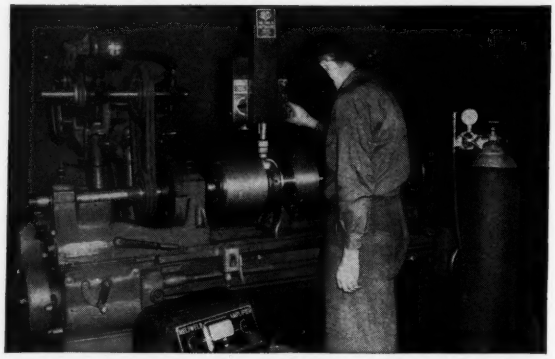
Inert gas-shielded Heliwelding eliminates the need for flux . . . prevents slag formation—permitting 'clear view' operation. Its gas-shielded electrode provides a highly concentrated arc . . . permitting exceptional welding speeds with a minimum of distortion.

Production-running these oxygen lifesavers is just one of the countless jobs Heliwelding can do in your plant or shop. Find out how it can be used for you. Write . . . or phone your nearest Airco Office. Ask for your copy of ADC-709: "Heliwelding—Catalog 9".

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

Completed Breathing oxygen cylinders.



Manufactured by the D. K. Manufacturing Company, Chicago, Illinois, breathing oxygen cylinders like those above must be the products of perfect welding. To insure perfection on a production-run basis D. K. uses Heliwelding for their construction.

Companion-piece of the Heliweld Automatic Head, this jig-mounted manual, water-cooled Heliweld Holder fastens outlet spuds at the rate of nearly two hundred a day to begin the production run of oxygen breathing cylinders for D. K. Manufacturing Co.

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

RARE EARTH" materials, which have commanded great and growing interest even as imported from foreign sources, can now be produced in abundance within the United States.

The Molybdenum Corporation is able to report that highly modern facilities are being installed and rapid growth provided for. Technical research, looking toward new and better employment of these materials, has been extensive and will continue. Consultation with present or prospective users is invited.

As a supplier of Molybdenum, Tungsten, Boron, and other alloying materials, the Molybdenum Corporation welcomes correspondence on any application or requirement.

AMERICAN Production, American Distribution, American Control, Completely Integrated

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco

Sales Representatives: American Steel and Supply Co., Chicago; Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N.J.

Works: Washington, Pa.; York, Pa.

MOLYBDENUM

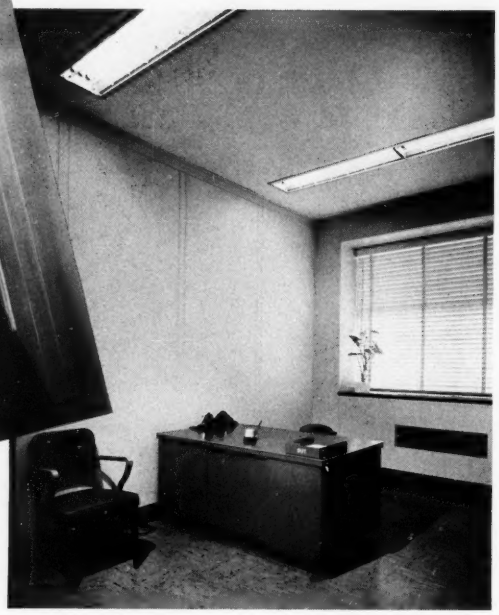
CORPORATION OF AMERICA
Grant Building . Pittsburgh, Pa.

MCA

Problem...

GETTING GREATER FLEXIBILITY, MAXIMUM UTILIZATION OF SCARCE STEEL WITH SMALLER INVENTORIES . . . .

Industrial building corridor shows the variety of panel widths required. Note ripple-free flatness of panels. Hauserman can cut these from one width of coil stock.



Neat, trim business office of Hauserman panels. Note clean window lines and wainscoting. Hauserman now can produce any necessary width from wide coils, eliminating heavy steel inventories.

The E. F. Hauserman Company, Cleveland, Ohio, is the world's largest manufacturer of movable steel partitions and wainscot panels. Their operation demanded flat steel of innumerable dimensions, trimmed and leveled to precision flatness. As the sheets came from the steel mills they were stretcher leveled to commercial tolerances, or a buckle of not over ¼" high. But in the manufacturing of Hauserman partitions, they insisted on the maximum tolerance of 1/16", or practically dead flat.

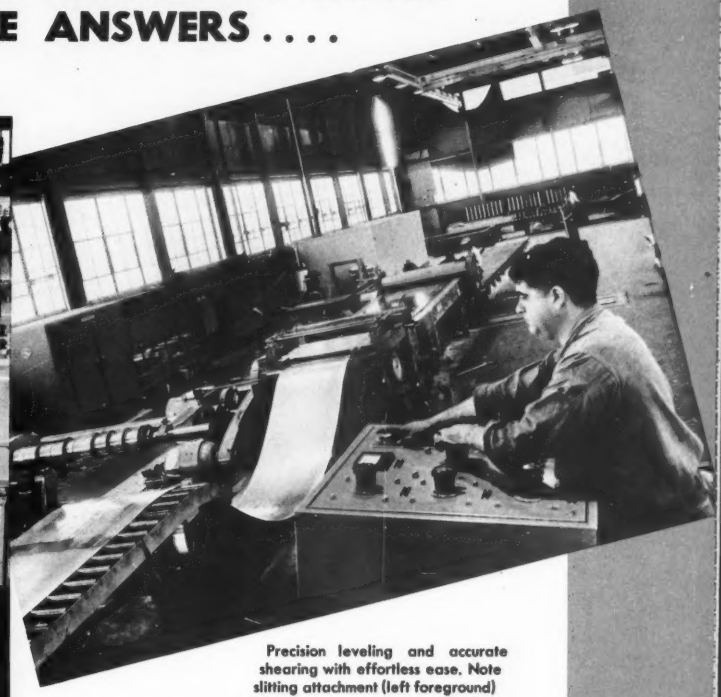
The steel mills had met Hauserman's flatness requirements, but it was costly for them as well as Hauserman. Steel producers encouraged Hauserman to look into the possibilities of providing their own leveling facilities.

Add to this the fact that Hauserman's operations required sheets of many sizes in lengths from 3 to 12 feet and widths from 1 to 5 feet. In using mill sheets Hauserman had either to stockpile multiple lengths and widths to obtain a flexible inventory or to stock larger sized sheets and trim them as they were needed — which resulted in unnecessary waste.

Solution...

WEAN COMBINED SLITTING, SHEARING AND LEVELING SET-UP FOR MANUFACTURING PLANTS PROVIDES THE ANSWERS....

Receiving end of Wean shear line shows compact, easily maintained arrangement. Elevated control stand permits full view of all operations.



Precision leveling and accurate shearing with effortless ease. Note slitting attachment (left foreground) that can be easily engaged for the production of narrow strip.

Encouraged by basic steel producers Hauserman engineers decided to do their own slitting, shearing and leveling. Working with Wean Equipment Corporation's engineers a complete operation was designed and built that enables Hauserman to buy commercial coil stock in a minimum of widths, shear to desired dimensions, level as required — to maintain complete stocks with a minimum inventory.

The first station on the Wean line is an uncoiler from which the stock passes into a gang slitter where it is edge trimmed and slit to desired widths. The steel may then be recoiled and stored. When sheets are desired, the stock by-passes the recoiler and enters the flying shear to be cut in sheet lengths. Semi-automatic roller conveyors enable Hauserman to move the steel to storage or to send it through the leveling section of the line where the roller leveler actually delivers improved flatness over the stretcher leveled stock formerly used.

THE ANSWER IS RESULTS . . .

Wean maintains perhaps the most experienced staff of special machinery and equipment engineers and construction craftsmen in the nation.

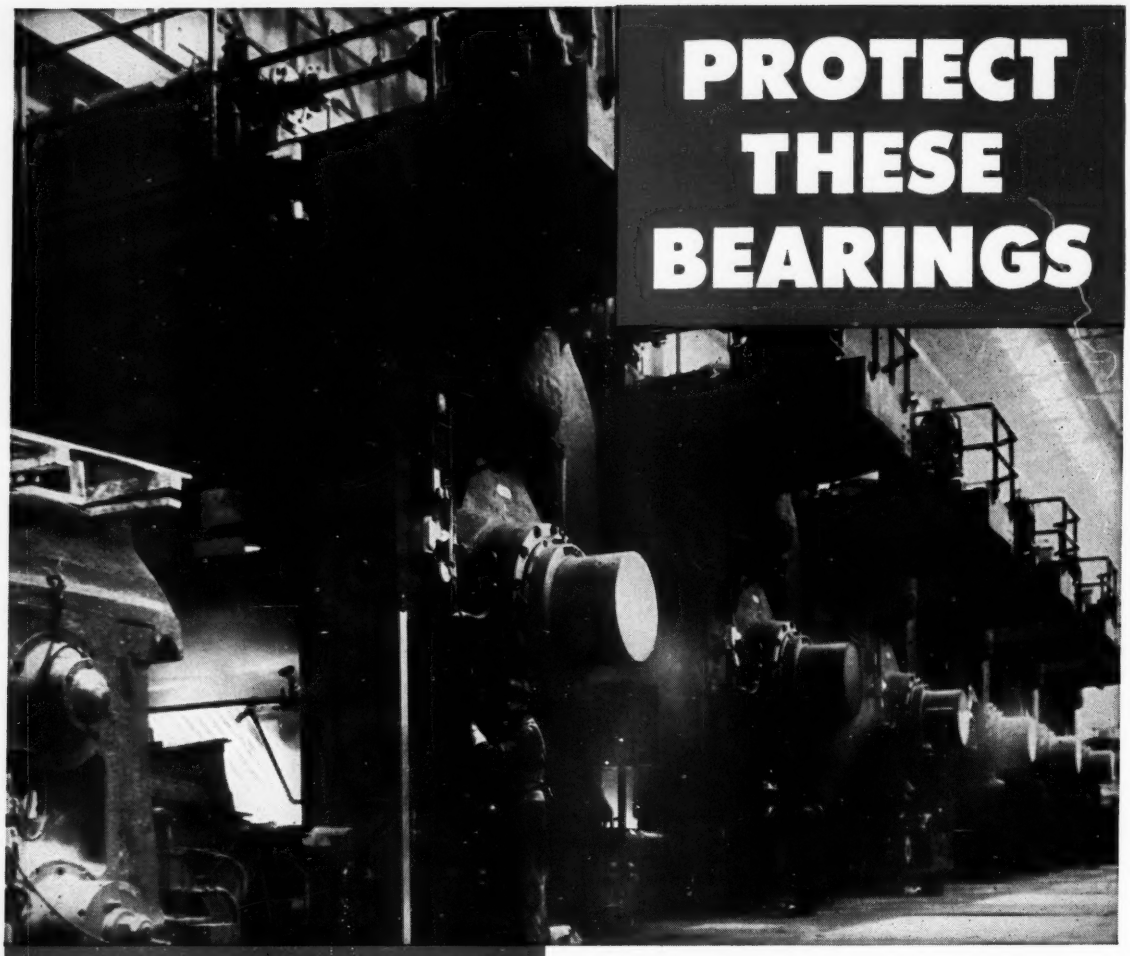
Whatever your special machinery problem, your engineers can have this result-getting combination by contacting Wean Equipment Corp., 22800 Lakeland Boulevard, Cleveland, Ohio.

MACHINERY TODAY IS THE BUSINESS OF THE

EQUIPMENT CORPORATION

Wean

Cleveland, Ohio



PROTECT THESE BEARINGS

...Assure clean circulating systems with TEXACO REGAL OIL

When oil film roll necks are lubricated with *Texaco Regal Oil,* they get the full protection that means uninterrupted operation, longer bearing life and lower maintenance costs.

Texaco Regal Oil is turbine-quality for heavy-duty service. Because it resists oxidation, emulsification and sludging, it keeps the circulating system clean. Thus, a constant flow of cool, clean lubricant to the bearings is assured; and the tough film of *Texaco Regal Oil* carries heavy loads easily under all operating conditions. There is a complete line of *Texaco Regal Oils* to meet all requirements.

In your enclosed reduction gear drives, use *Texaco Meropa Lubricant.* It has extra oxidation resistance, does not foam, assures longer gear life.

Let a Texaco Lubrication Engineer help you keep all your machinery at top efficiency. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

Faithfully yours 50 TEXACO *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

The Metalworking Outlook

May 19, 1952

Still Pitching for Labor

The statements of Vice President Alben Barkley and Labor Secretary Maurice Tobin at the steelworkers' convention last week indicate that the Administration will continue to use every power at its command—and maybe some that aren't legally at its disposal—to help Mr. Murray even if the Supreme Court upholds Judge Pine. Mr. Truman's earlier statement that he "will abide by whatever the court decides" must be heavily discounted. A union strike will bring strong Administration publicity action to whitewash labor and tar management.

Coincidence?

Perhaps the timing is only happenstance, but the U.S. is suddenly getting tough about defense loans to steel companies. Many firms have had trouble getting attractive terms on loans from private sources for their expansions and would welcome the more lenient federal terms. A steel wage boost without a fully compensating price rise makes the problem more complex. If that "solution" finally ends the steel case, Bethlehem Steel Co.'s current $219 million expansion, for example, would be increased in cost by $25 or $30 million. DPA has turned down loans to Lone Star Steel Co., Kentucky Steel Corp., Central Iron & Steel Co., Trenton Steel Corp. and Detroit Steel Co. The RFC has also turned down the same loan requests by Kentucky and Central. Lone Star withdrew its application.

Aluminum Decontrol by Summer?

Watch for a shift in decontrol emphasis from steel to aluminum. The situation in the light metal is improving so rapidly (p. 177) that an easing on restrictions may start this summer. The strike threat in steel doesn't help decontrol plans for that metal. But the Steel Products Industry Advisory Committee is still plugging for the lifting of regulations. It proposes an interim plan of partial decontrol for the fourth quarter. If no serious problems arise in that period, the group then recommends complete removal immediately of all curbs.

Defense Orders for Tool Shops

Tool and die shops still are heavily booked with defense orders, an indication that defense spending won't drop sharply as some fear. Most shops have armament orders that approximate at least 50 per cent of their business. Some have as much as 90 per cent of their production going to defense. The largest war orders come from the aircraft and electronics industries.

Hassle Over Industrial Furnaces

Industrial furnace manufacturers are disturbed. Some of the companies that have the capacity to build big units (up to 120 feet long) required by the users of the Air Force's giant presses were not invited

Production-Engineering News—p. 89 *The Market Outlook—p. 165*

to attend a meeting to discuss the large furnaces; manufacturers of those units claim that a big-furnace program will be of such a scope that business is available for all firms that have the capacity for such apparatus. But only some of the makers were invited to attend a May 15 meeting, scheduled only one day after the annual convention of Industrial Furnace Manufacturers Association (p. 62). Users of the big presses include Aluminum Co. of America, Harvey Machine Co. Inc., Reynolds Metals Co., Wyman-Gordon Co., Bohn Aluminum & Brass Corp., Curtiss Wright Corp. and Kaiser Aluminum & Chemical Corp.

Coming: Higher Truck Rates

Some 700 motor carriers in the Rocky Mountain area have won a 6 per cent freight rate hike. Other truckers will eventually get the raise, and the old rail-truck rate differential will soon be restored. The rail rate increase alone is expensive. Bethlehem estimates the boost costs it nearly $1 a ton of finished steel, the company having to absorb the higher rates on incoming shipments of raw materials.

The Hex on Regulation X

Regulation X, the credit control curb on housing, may soon be eased. Regulation W on installment buying has been lifted entirely, as has been the voluntary credit program for banks. Significance: The Administration is priming the economic pumps to get a full business flow in time for Presidential elections in November.

Standard: 27-inch TV Tubes

Your 17-inch television set will soon be as obsolete as the old 10-inch models. Manufacturers have agreed to standardize on a 27-inch tube. They haven't yet bought the equipment to build the larger size, but they are planning such expenditures now.

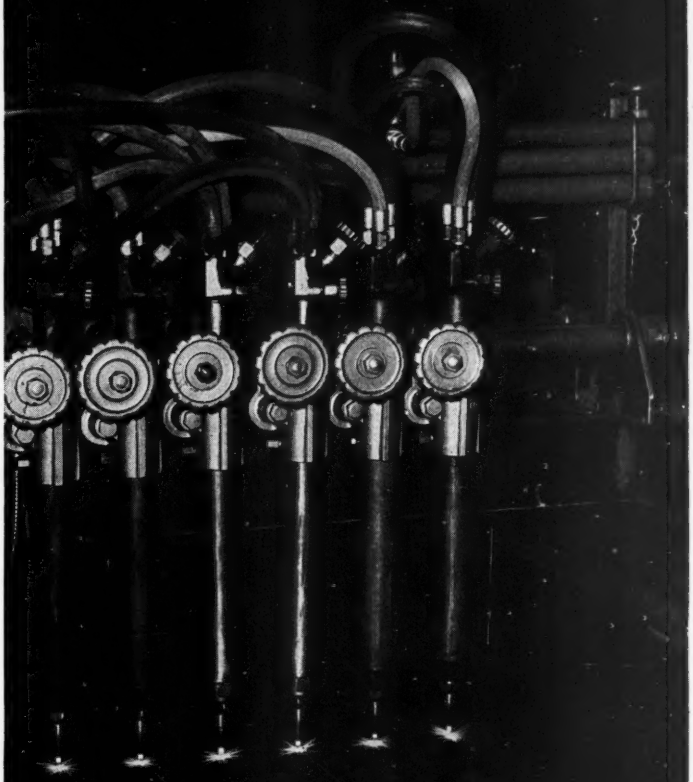
Straws in the Wind

E. I. du Pont de Nemours & Co. plans to triple capacity to produce titanium sponge . . . Wage and price controls would be extended until Mar. 1, 1953, under a bill tentatively adopted by the Senate Banking Committee last week . . . Expect more price cuts on appliances; the latest mark-down, $20, is by Whirlpool Corp. on its automatic washer . . . The oil strike did not seriously hamper many metalworking operations . . . Fourth quarter CMP-4B applications are due June 1.

What Industry Is Doing

One result of the present steel debacle may be fairer labor laws (p. 61) . . . Alloy forgings production will be stepped up 25 per cent to meet demand of heavy press and power programs (p. 62) . . . Canadian industry is moving to the forefront fast (p. 63) . . . NPA is finding it tough to determine whose electrical standards should be used by industry (p. 71) . . . Manufacturers of screw machine products are worried about falling order backlogs (p. 71) . . . Expansion of sheet metal distribution is severely crimped by low profits after taxes (p. 72) . . . Many companies are zipping up sales efforts now that new orders are not easy to get (p. 73).

. . . so we built a plate slitter!



This precision plate slitter was developed to solve two of OUR problems . . . production costs and inventory.
As custom engineering and fabricating specialists, we can help with YOUR production problems . . . the tough ones.

As builders of special machinery and fabricators of welded machinery parts, we work with steel plates and bars of all sizes.

For production efficiency and economy, we decided to cut wide stock plates to our specifications. We needed a machine to make straight, square cuts in plates too thick to shear, and **we couldn't find standard equipment to fill all our requirements . . .**

. . . so we built a plate slitter!

Our new unit is completely adjustable for width, length, depth and speed of cut . . . has centralized controls for one-man operation . . . features width tolerance of 1/16-inch . . . makes eight simultaneous cuts to reduce production cost and minimize warpage . . . has an auxiliary cross-cut torch to reduce material handling . . . and **has paid for itself many times.**

While your needs may not include a plate slitter, we are prepared to help engineer your product or to fabricate a difficult component. We are as near as your telephone.

Call us at BEdford 2-2500.

THE LEWIS WELDING & ENGINEERING CORPORATION

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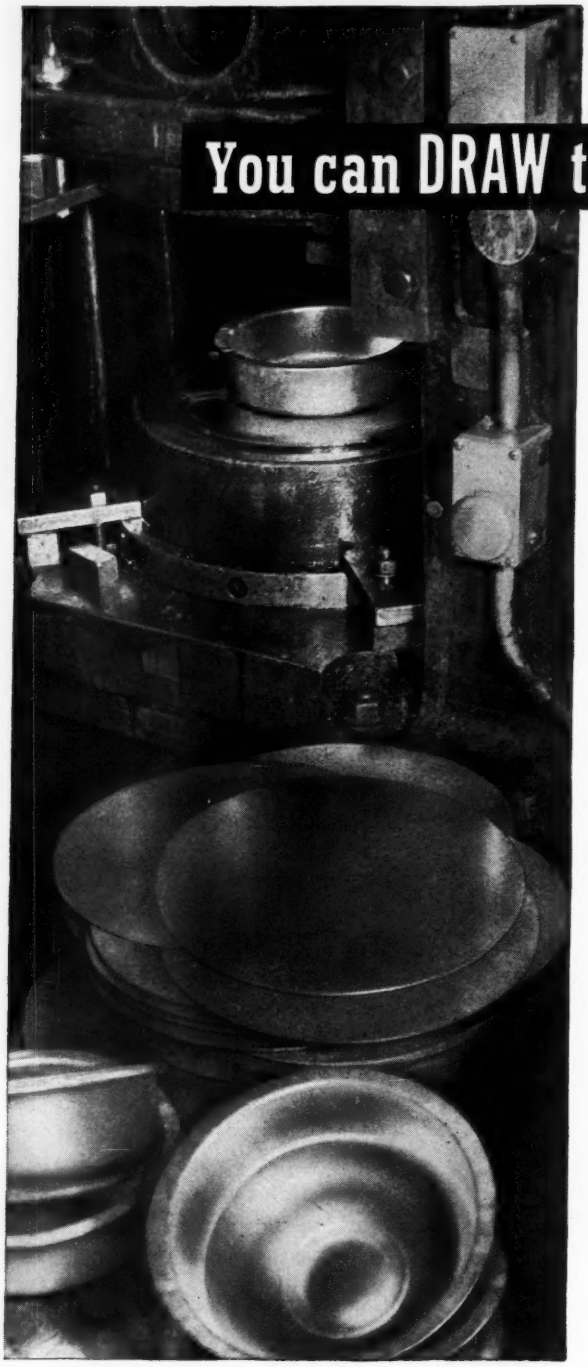


You can DRAW this Zinc-Coated Steel

No flakes, no breaks are found when these oil-reservoir bodies for heaters are drawn from blanks of Armco Drawing Quality ZINCGRIP Steel.

The specially-applied coating on Armco ZINCGRIP does everything asked of it. In one draw, the coating stretches perfectly *with* the steel base.

This means real production savings. And it means *complete rust protection* for fabricated products and equipment—on sharp bends as well as flat parts.

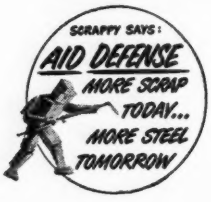
16-year service record

ZINCGRIP now has a record of more than 16 years in proved service. Created by Armco in 1936, it was the first sheet steel hot-dip coated on a continuous production line.

Armco ZINCGRIP is produced in sheets or coils. ZINCGRIP PAINTGRIP is a companion zinc-coated sheet steel for products to be painted. The ZINCGRIP steel is Bonderized to take and hold paint without pre-treatments of any kind.

The ZINCGRIP coating, after 20 per cent stretching, adheres tightly and protectively to the base metal. There is no brittle iron-zinc alloy layer.

Cross-section of a conventional galvanized coating after the metal was stretched only 15 per cent. Dark areas are cracks which spread from the brittle iron-zinc alloy layer, causing the coating to flake or peel off.



ARMCO STEEL CORPORATION

3052 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

The Squeeze Is On!

One of the inevitable aftermaths of the Supreme Court decision on seizure of the steel industry will be a sixth-round increase in the metalworking industry's annual wage bill of anywhere from $2 to $4 billion. At the same time, there is increasing evidence that it will be difficult to pass all of this wage bill along whether you make basic materials, component parts or finished goods. It means there will be a further squeeze on already diminishing margins available for profit and less opportunity to store up fat for possible leaner days. So, now is a good time to think about the course you will want to chart for your company over the coming months.

Few manufacturers of metalworking products have experienced the recession in textiles but sales are coming harder. Barring long strikes, most materials will be out from under controls by January 1, perhaps sooner. Credit restrictions on consumer goods have been greatly relaxed. Auto builders are dusting off plans for new engines and body designs. Twenty-seven inch tube television sets with moderate price tags are on the way to attract more buyers.

These indications of increasing competition do not mean we are heading into a depression. Military spending is not yet at its peak. Capital goods production will be high for many months. Industrial construction has tapered but other types still are more active than anticipated. Consumer buying is a few percentage points under last year but tending to rise.

In coping with higher costs and increased competition, here are some of the things you can do to obtain a measure of relief:

If you have government business, remember that the 1951 renegotiation act is a lot tougher than its predecessors and will take the biggest slice of profits next to taxes. Make certain work subject to renegotiation is segregated.

Get new and improved products ready for the market. See whether they are designed to make most efficient use of materials.

Analyze your markets and see whether your sales and distributor organizations are adequate to get your share of total business, which should be 25 per cent greater within eight years.

Check on the many recent improvements in production and handling techniques. Your competitors already may be using them!

The squeeze is on profits and individual enterprise and the full ingenuity of you in American management must be applied to relieve it.

Irwin H. Such

EDITOR

OUR STAKE IN CANADA: Visitors to Canada compare its industrialization program to that of the United States 50 or 60 years ago. The Dominion's rich mineral resources, abundant and cheap hydroelectric power, plus a tough, ambitious and realistic people suggest that in the years to come Canada will be one of the world's really great industrial powers.

United States metalworking companies are playing an important role in the already im-

pressive expansion of Canadian industry. A large share of the metalworking companies north of the border boast parents in the United States. This works to advantage for both countries. For Canada it provides capital and manufacturing know-how. It makes available goods for which there is a ready-made acceptance. Were it not for United States participation, Canada's development could not be so rapid.

For United States companies, Canada offers an important and growing market. Companies operating there like the treatment they receive by a government which believes in private enterprise. Benefits of Canada's development extend to increased sales of capital goods by U.S. firms with no plants there.

Canadians find only one bug in the situation. They can't understand why the United States moves so slowly toward joint development of the St. Lawrence seaway and power projects.

* * *

IN THE MIDDLE: The National Production Authority has stirred up a little hornet's nest and now is in danger of being stung from all sides (p. 71). It prepared an order which would make the electrical systems of all metalworking equipment conform with the standards adopted by the National Machine Tool Builders' Association.

The government agency reckoned without the Joint Industry Conference, a group composed principally of equipment users, especially automakers. JIC has its own standards and objects to being forced to accept the tool builders'.

Both sets of standards have merits, and NPA either will have to withdraw its proposed order entirely or try to write one pleasing both organizations.

The point is this: Whenever the government steps in to control things, an endless series of electrical standard situations arises. Individually, such situations can be tolerated, but when they pile up as they are starting to now, controls become intolerable.

* * *

A CASE FOR PROFIT: Those who would have us believe it is sinful to make a profit have not learned the basic economic fact of life that without profit there is no production.

Here is a case they should look at. Right now, the unfavorable financial return on galvanized steel sheets, a product in strong demand, is a deterrent to an adequate supply. Addressing the National Association of Sheet Metal Distributors, Howard Williams of Continental Steel Corp. (p. 72) said, "We now have a real battle on our hands trying to figure out how to continue production of galvanized sheets at a fair profit. No special effort can be made to increase production of a product when the margin of profit is questionable."

Whether a favorable profit atmosphere can be provided for production of galvanized sheets remains to be seen, but the problem demonstrates that demand alone does not bring production. There must be a real incentive, an opportunity to make a reasonable profit.

* * *

UP TO DATE: You have undoubtedly modernized your plant since 1939, but is your sales force a prewar model? Many companies are devoting new attention to sales, a survey by this publication (p. 73) shows.

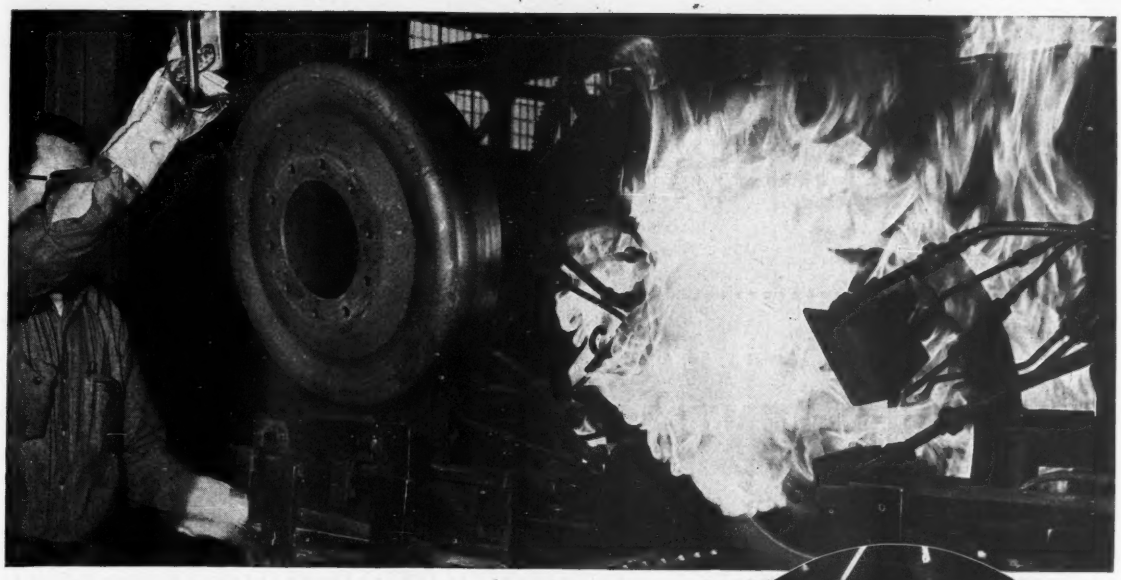
Advertising is switching from institutional to more direct veins. Salesmen get new training, more sales-engineers are hired. Dealerships and distributorships get re-examined for their effectiveness. Better service is emphasized.

Significantly, a lot of companies are studying their sales setups even though business is still excellent. At conventions of the Industrial Furnace Manufacturers' Association (p. 62) and the National Screw Machine Products Association (p. 71), speakers pointed to the storm signals on the business horizons and warned the members to take precautions while there is time.

And one wise precaution, of course, is a modernization of your sales methods.

* * *

TRAINING IS A "MUST": Management cannot afford to sell training short. The words are familiar, but the full impact of their meaning apparently has gone unheeded. It seems the tendency has been to consider training too much of an extracurricular activity. Now comes the pay-off. Manpower shortages today threaten within the ranks of management. Speaking before the manufacturing conference of the American Management Association (p. 127) Louis A. Allen, manager of personnel administration and training for Koppers Co. Inc., asserted that only lately has management become fully aware that it is suffering from a dearth of manpower within its own ranks. Right now, he said, it is becoming the ceiling on profitable production in many companies. The problem cannot be solved by going outside because those sources are rapidly drying up. Since those sources are no longer available, the logical answer, he says, is to work with the people you already have.



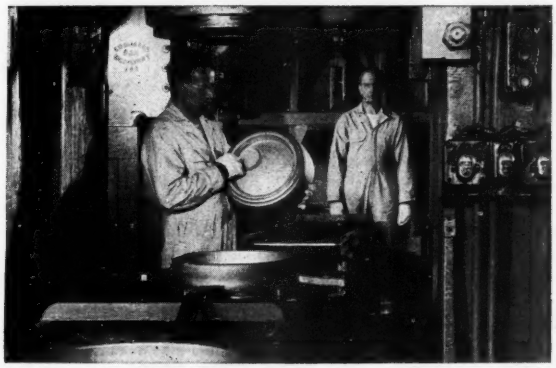
HEAT TREATING

IS ONE OF THE INTEGRATED OPERATIONS GEARED TO FAST, LOW-COST PRODUCTION

AT Firestone

A flash! — then quick heating and quenching on this specially designed heat treating equipment provides for proper conditioning of steel to its specific use. This operation, which assures high-speed, accurately controlled and uniform results, is part of the integrated, straight-line, low-cost production of large steel stampings at Firestone. It will pay you to figure with Firestone on your metal stampings and sub-assemblies. Write Metal Stampings Division, Firestone Steel Products, Akron 1, Ohio.

Roller conveyors and overhead handling systems eliminate production bottlenecks and assure continuous, straight-line, low-cost production in all Firestone Steel Products operations.



Multi-operation presses are set up to save time by providing continuous flow of material under constant inspection.

Large-bed-area presses capable of high volume production accommodate large heavy-gauge stampings.

Enjoy the Voice of Firestone on Radio and Television Every Monday Evening over NBC

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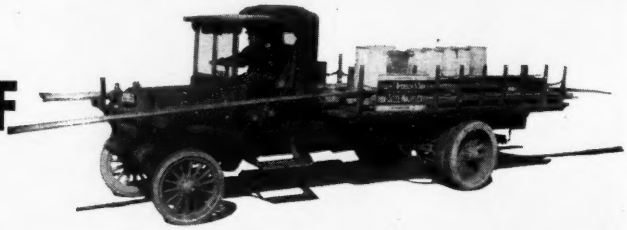
FOR 110 YEARS...

QUICK SHIPMENT OF



STEEL FROM STOCK

Here, at a glance, is a quick review of more than a century's progress in the delivery of Ryerson steel.

The original Dobbins made their plodding rounds from a single small iron store. Today, their mechanized successors speed delivery from a network of fifteen huge steel-service plants.

And, while the first Ryerson wagon carried such products as saddle tree, horse shoe and boiler iron, today's giant trucks deliver an almost endless variety of carbon, alloy and stainless steels.

The Ryerson sales representative, too, has changed with the times. Today he heads up a team of specialists who are ready and able to help you on every problem relating to steel from stock.

While current demand may deplete supplies of some sizes, our over-all stocks are large and complete. And you can always count on the same friendly will to help that steel buyers have found at Ryerson for 110 years.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS...BARS, STRUCTURALS, PLATES, SHEETS, TUBING, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Steel Case Spurs New Labor Law

The debacle in steel, plus labor troubles in oil, communications and transportation, put Congress in the mood to get tough with the big unions

OUT OF THE steel debacle may come some good: Fairer labor laws.

Congress now is buzzing with all kinds of proposals, few of them yet completely worked out. Some would strengthen the Taft-Hartley Act, another would set up a system of labor courts, yet another would ban industry-wide strikes and industry-wide contracts with unions and one having heavy support would ban strikes in any industry affecting defense whenever an emergency is declared.

Cause and Effect — The steel situation is the chief reason why majority congressional opinion is swinging strongly against labor. The swing has also gained momentum from the labor troubles in oil, among communications workers, in the long and controversial railroad seizure by the U. S. and in the electrical industry.

Many congressmen are convinced that court procedures are too slow in working out labor disputes. They want more clear-cut legislation that won't require judicial intepretation. They agree that the Supreme Court should take its time in deliberating on the constitutional aspects of the steel case, but they point out that if we had fair labor laws the whole matter would never have gone to court.

Wait for Decision? — Justice Robert H. Jackson last week probably scotched chances of a fast ruling on the steel case. Sometimes the Supreme Court gives a decision quickly, then later hands down its lengthy written opinion. Justice Jackson insisted that the court write its opinion first before giving the ruling. That means time will be required, and the court may even have to postpone its June 2 adjournment date.

The justices' sharp questions to Acting Attorney General Philip B. Perlman who argued the government's case are interpreted by some lawyers as a hopeful sign that the court will rule the steel seizure unconstitutional. The steel companies' lawyer, John W. Davis, presented his case and received few comments from the bench.

PHILIP MURRAY
. . . he lambastes management

If Industry Wins — Should the steel companies win the case, another steel strike is likely. The belligerent atmosphere last week at the convention of the United Steelworkers of America in Philadelphia supports that view. President Philip Murray said the steel companies "can go to hell as far as I am concerned." Indications are that the union is unusually edgy now. Odds are for a series of "unauthorized" walkouts even before the High Court rules. Mr. Murray may have trouble keeping his entire organization in check if it appears that the court will deliberate well into June.

Strike fears are causing a flurry in steel buying, but consumers are limited in what they can do by CMP. Although users may legally have 45-day inventories on most steel products, few have that much. The average stocks can last for about 30 days.

Bad Effect—Another strike, the third this year, will have disastrous effects on steel company earnings and make management less able than ever to pay higher wages without compensating price hikes. First quarter earnings showed a marked decline from the same period in 1951 because of higher

April Steel Output Was Lowest in Over a Year

LABOR TROUBLE in the steel industry cut April steel ingot production to the lowest level since February, 1951.

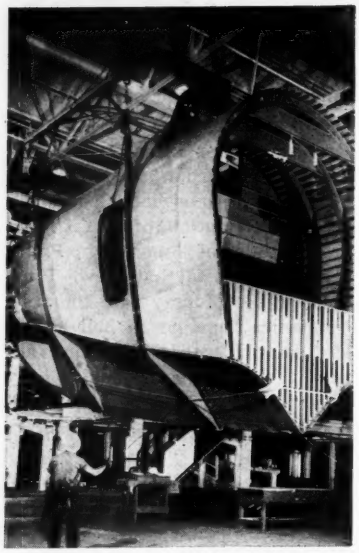
April output of steel for ingots and castings is preliminarily totaled at 7,983,000 net tons by the American Iron & Steel Institute. Operations were at 89.6 per cent of capacity.

The drop in April was in sharp contrast with production in March, when an alltime monthly output record was set.

	OPEN-HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	No. of weeks in mos.
1952	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity		
January	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
February	7,703,066	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,091,114	4.14
March	8,401,140	104.4	378,861	83.1	624,190	89.5	9,404,191	102.2	2,122,842	4.43
1st Qtr.	24,207,329	102.5	1,168,871	87.4	1,821,318	89.0	27,197,518	100.7	2,092,117	13.00
†April	7,096,000	91.1	323,000	73.2	564,000	83.5	7,983,000	89.6	1,861,000	4.29
1951										
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29

Note—The percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,637 net tons open-hearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952, as follows: Open-hearth 94,973,780 net tons; bessemer 5,381,000 net tons; electric 8,232,890 net tons; total 108,587,670 net tons. The percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer, 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons, bessemer 5,621,000 net tons, electric 7,554,630 net tons; total 104,229,650 net tons.

† Preliminary figures, subject to revision.



Launching a Nose

First production nose section of the R3Y, Navy turboprop flying boat, is being "launched" at Consolidated Vultee Aircraft Corp., San Diego, Calif. The 80-ton R3Y is planned as a personnel-cargo plane with a top speed over 350 mph and great flying range

taxes. Actual ingot production in the first quarter this year was 1,350,000 tons more than in the 1951 period (see the table, p.61).

Net earnings of the eight largest steel companies in the first quarter (U. S. Steel, Bethlehem, Republic, Jones & Laughlin, National, Armco, Youngstown Sheet & Tube and Inland) totaled $109,693,126, compared with $133,621,416 in the same three months of 1951.

Steelers Earning More for Less

The hourly earnings of wage earners in the iron and steel industry averaged $1.95 in March, compared with an average of $1.942 in February and $1.92 in March, 1951, American Iron & Steel Institute reports.

Total employment in the industry in March was estimated at 672,100, off 1900 from February but 9000 higher than in March, 1951. Total estimated payroll in March was $242,731,000, up $7.9 million from February and $4.4 million from March, 1951. In the first quarter of 1952 the payroll was nearly $730 million, an increase of almost $27 million over the similar period a year earlier. Wage earners worked an average of 39.8 hours a week in March, compared with 40.9 in February and 40.4 in March, 1951.

Alloy Forgings Speeded

Output will be upped 25 per cent to help meet demand from heavy press, power programs

PRODUCTION of large alloy forgings will be stepped up about 25 per cent to meet the increased demand from the heavy press and power programs.

In the last two months, backlogs rose 100,000 tons and now total 720,000 tons. Even with stepped-up production, deliveries will run through 1953.

Limited Capacity—Bulk of the tonnage is held by a relatively few companies, capacity for producing large forgings being limited. Some of the forgings on order run to 100 tons each. Orders for die blocks for the heavy presses needed by the aluminum forging industry will amount to about 67,000 tons over the next 18 months.

Currently, supply conditions in the alloy steel market are less critical than they were. Some steelmakers have received cancellations that have enabled them to accept new orders for second and third-quarter delivery. Generally, they are booked up through third quarter and could book further ahead were they so disposed. Because of the labor discord in the industry they are reluctant to commit themselves beyond end of third quarter, pending settlement of the wage-price dispute.

Pinch in Steel — Forge shops in general continue pinched for steel supplies, but the stringency is more severe in carbon than in alloy grades. Carbon forging billets and bars are a little easier to obtain than they were but they are not sufficiently plentiful to meet all demands promptly. Prospects are not promising for early improvement, for military and other defense needs are still rising.

Bright Future Seen for LP Gas

Demand for liquefied petroleum gas will level off at about 5 billion gallons in 1952 and reach 5.8 billion gallons in 1953 is the prediction of Richard P. Walsh, director of Natural Gas Production and Processing Division of PAD.

He told the members of the LP gas industry at their annual convention in Chicago that present and proposed capacity of the industry should be sufficient to meet demand over the next two years. The biggest question mark in the picture being whether storage space can be found for excess summer production.

Also speaking at the convention, Harry J. Holbrook, director, Consumer Durable Goods Division, NPA, said, a recent telephone survey indicates that of all gas-fired commercial cooking equipment being shipped today, about 30 per cent is for LP gas.

Fewer Furnaces?

Manufacturers meeting in Hot Springs see decline in demand but business will still be good

NEW ORDERS for industrial furnaces are falling off; order cancellations are increasing perceptibly; and the total order backlog is sinking moderately despite the fact that it still totals $90.3 million and is 6 per cent above what it was a year ago.

That note of moderate pessmism dominated the meeting of Industrial Furnace Manufacturers' Association at Hot Springs, Va. Despite that outlook, the major companies in the industry expect to operate on a high plateau for at least 10 or 12 months.

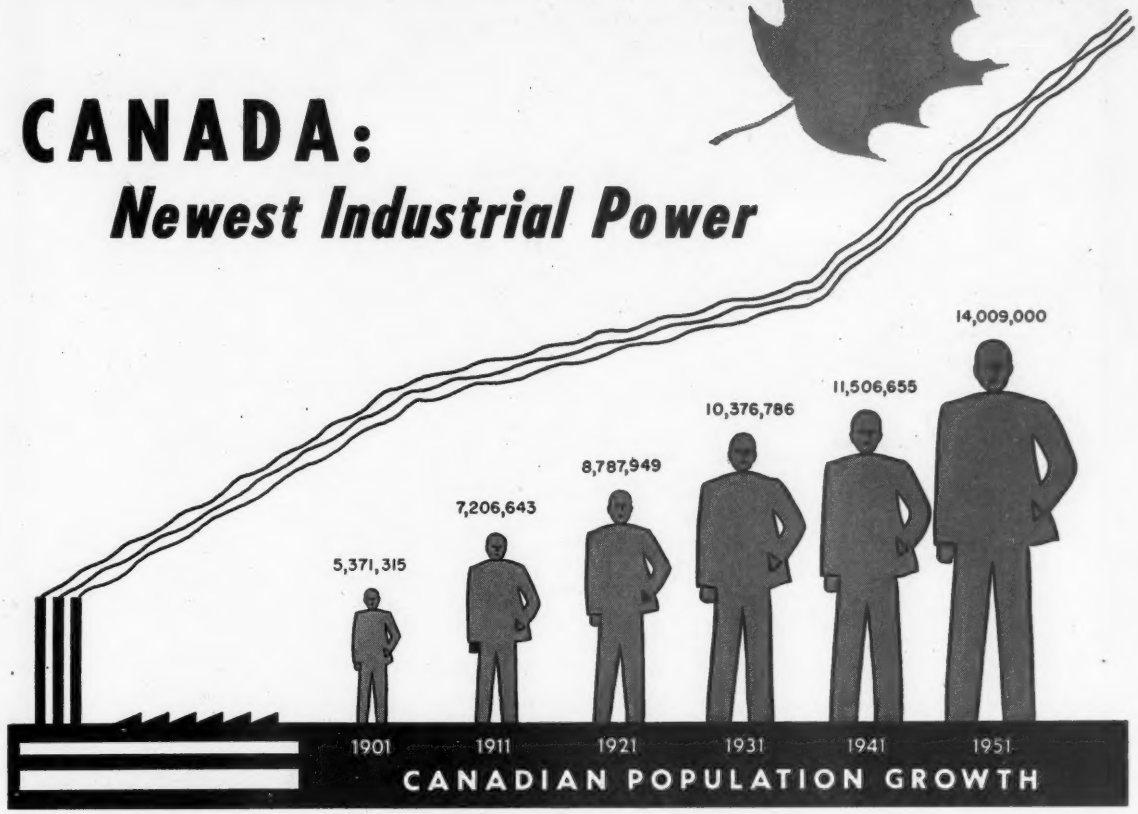
Coming Up—New business in the offing involves huge furnaces up to 120 feet long for use with big presses ordered for the military aircraft program. Preliminary discussion on those units was held May 15.

Some normal-sized idle furnaces left over from the last emergency will be taken over by NPA and allocated to industry. Hundreds of those are available.

New IFMA president is J. J. Walker of C. I. Hayes Inc., Providence, R. I. Vice president is C. H. Vaughan of Electric Furnace Co., Salem, O. New directors are: Hugh Pugsley, Swindell-Dressler Corp., Pittsburgh; A. L. Hollinger, Surface Combustion Corp., Toledo, O.; and C. W. Hanlon, Hauck Mfg. Co., Brooklyn, N. Y.

A SPECIAL REPORT

CANADA:
Newest Industrial Power



By
Walter J. Campbell
Managing Editor

Have you looked across the border to the north lately? Underway is an industrial revolution that may have profound effects on the economy of the North American continent

FOURTEEN million Canadians are chortling over the premium the Canadian dollar now commands over United States currency. After years of having their dollars discounted, they now are happily discounting ours.

Parity-plus on the dollar is symbolic of Canada's new industrial and trade vigor. Before World War II, Canada was an important supplier of raw materials and agricultural produce, a pleasant vacationland and a good neighbor. But as an industrial power, it was only second rate.

On the Gallop—Now it is moving up to the fore fast. Walk into the office of a metalworking executive in Hamilton, Toronto, London or Windsor, a banker in Montreal, a government official in Ottawa or a Bay Street stock promotor in Toronto and you find tremendous enthusiasm for Canada's future development. You hear predictions that the country's population will grow to 40 million to 50 million in the next half century. You are told the rich mineral resources of the country, plus its abundant and cheap hydroelectric power, plus the industrial know-how being imported from the U. S., plus the tough realism of the Canadians will make the Dominion one of the world's great industrial powers. Says one high Ottawa official: "The last half of the twentieth century belongs to Canada."

Can It Be?—If you think these expectations are overly optimistic, take a look at Canada's growth since 1939.

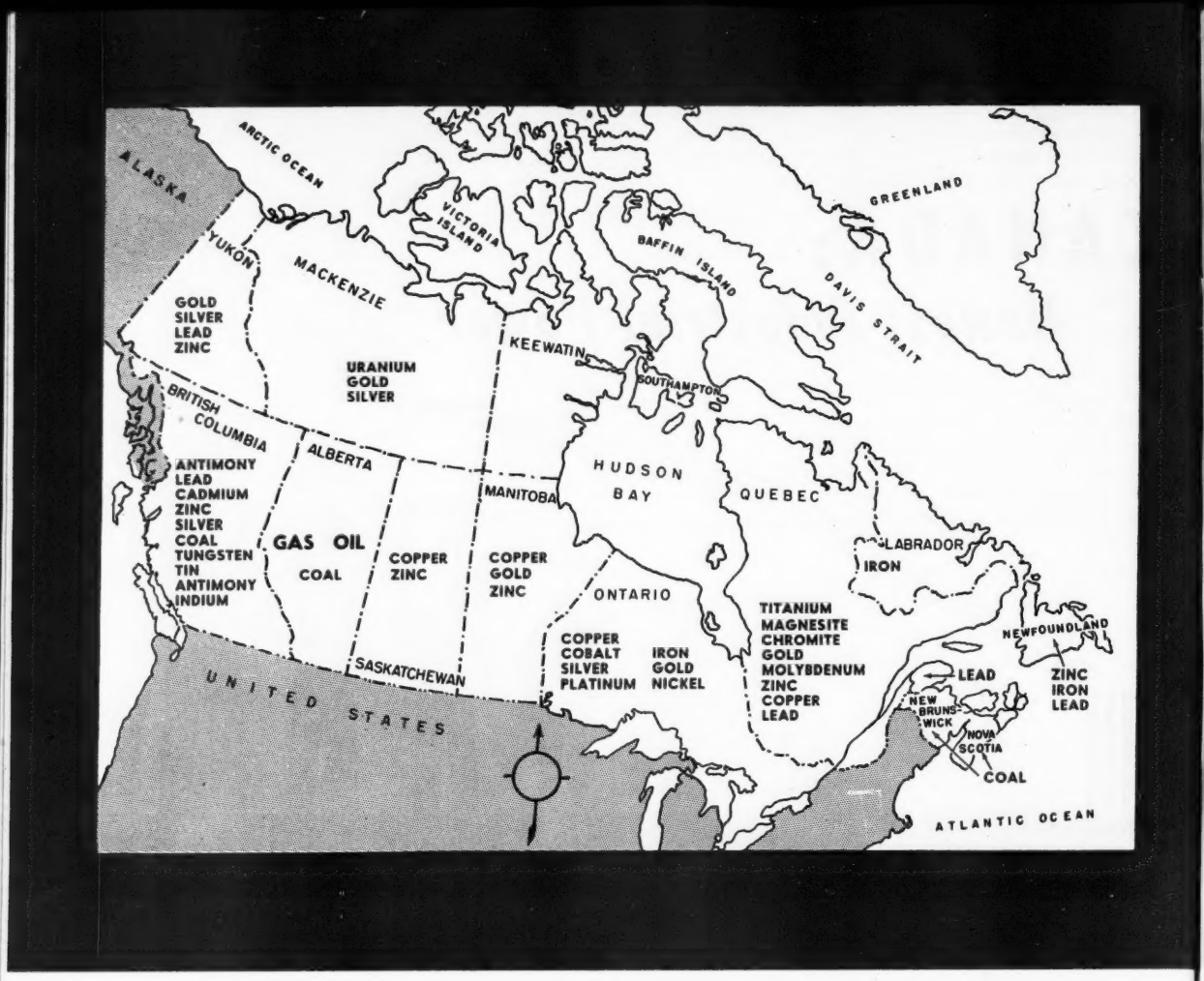
Gross national product climbed from $5.7 billion in 1939 to an estimated $24 billion for this year.

Manufacturing production was valued at $3.5 billion in 1939 and at $17.4 billion in 1951, a five-fold increase.

Investment in construction, machinery and equipment was $765 million in 1939. This year it will exceed $5 billion.

Exports increased from $925 million in 1939 to $3.9 billion in 1951. They will go substantially higher this year. Nearly two-thirds come to the United States.

New industries, many in metalworking, are being established across the border by United States companies as fast as construction can be provided. United States investment in Canada now exceeds $7.2 billion. The flow of capital across the border has been especially high in the past 30 months.



Eighty per cent of the foreign capital invested in Canada's development came from the United States.

What It Has—Canada is the third largest country in the world. Its land area is 3,845,144 square miles, slightly larger than the 3,608,787 square miles for the United States and Alaska.

Canada's mineral resources are large, rich and varied. It now ranks first in world production of nickel, asbestos and the platinum metals. It is second in aluminum, zinc, gold, cadmium, selenium, tellurium, radium and probably uranium. It is third in silver and fourth in copper, lead and cobalt.

Production figures do not tell the whole story of the Dominion's mineral resources for much of the country's "moose pastures" has not yet been adequately prospected. Development projects now underway will make Canada vastly more important as a producer of iron ore, petroleum and natural gas.

Low-cost hydroelectric power is one of the country's great resources. Dominion power officials estimate that water power resources represent a feasible installation of more than 55 million horsepower.

Why It Grows—The secret of Canada's recent and projected growth lies in a variety of factors, including the resources mentioned above.

Industrial expansion received major impetus by the outbreak of World War II when Canada threw her resources open to the Allies and by necessity became a major supplier of materiel. Since the end of World War II, Canada's industrialization proceeded at an accelerated pace.

Canadians attribute their postwar growth to these factors:

1. Wealth of natural resources.
2. High rate of capital investments by United States interests, by Canadian investors and by the Dominion government.
3. An encouraging business climate created by the Canadian government which favors private enterprise and adjusts policies to further the development of new enterprises.
4. Intense demand by Canadians for more goods and a higher standard of living and a considerable demand by other countries for the goods Canada can produce.
5. A tough and realistic ambition to grow.

How It Grows—Canada's expansion is most spectacular in aluminum, iron ore and steel, oil, automobiles and trucks, aircraft, electrical goods, machinery and metal

fabricating to serve the above expansions.

Aluminum—The Dominion now is the world's second largest producer and the largest exporter of aluminum. Last year, it produced more than 440,000 net tons of ingots. More than 80 per cent was exported, the bulk to the United Kingdom and United States. Presently, Canada's aluminum industry is centered in Quebec, and this province's capacity is being expanded. A huge new expansion program is going forward at Kitimat, British Columbia, which eventually may reach 550,000 net tons. Total Canadian aluminum capacity when projected expansions are completed will total 1,100,000 net tons.

Petroleum—Early in 1947, oil was discovered at Leduc, Alberta. This set off a boom that continues to grow and adds a substantial prop to Canada's capital expansion. Discoveries are being made in other western provinces and producing wells are being brought in this year at a rate of one every three days.

Iron Ore—Opening the Labrador-Quebec iron ore range will give Canada one of the world's largest and richest sources for this basic metallic. Development work is well underway by Iron Ore Co. of Canada and a railroad is under construction from Seven Islands to the mines. M. A. Hanna Co., Cleveland, is the principal backer of the development and five United States steel companies are participating. Limited shipments will start in 1954 and by 1955 will reach 5 million tons. These will be doubled in 1956. Should the St. Lawrence seaway be built, shipments from the range may climb to 20 million or 30 million tons yearly.

Canada's steel capacity at the beginning of 1951 was 4 million net tons. Expansion programs underway, especially by the Steel Co. of Canada at Hamilton, will increase this capacity by about 20 per cent by 1953. A substantial growth in electric furnace capacity is projected in the Dominion.

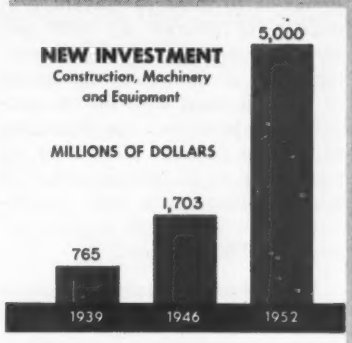
Another significant development is the Lake Allard, Quebec, discovery of more than 200 million tons of unusually pure ilmenite. Eventually, this will produce not only iron but 700 tons of titanium concentrate daily.

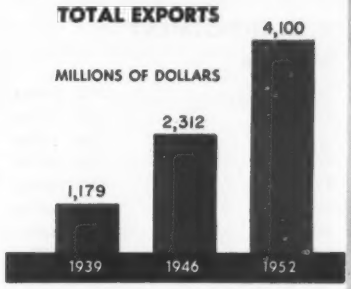
Automobiles—Passenger car and truck production in Canada in 1951 totaled 411,000 units, nearly three times the 1939 production. This tells only part of the Canadian automotive expansion story. Today's Canadian-built car is largely assembled from Canadian-built parts. A few years ago, many of the parts were imported from the United States.

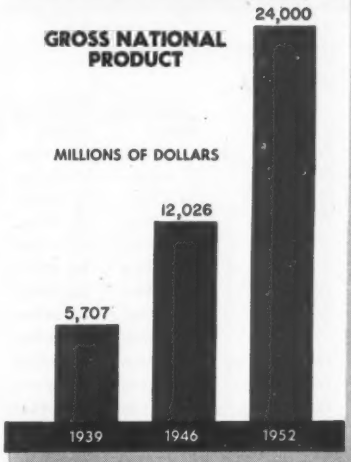
Electrical Goods—The high development of hydroelectric power north of the border created a big demand for all kinds of electrical goods. Canadian and United States companies operating in Canada answered the demand by pushing up production of electrical equipment rapidly.

In household appliances, the increase in production has been especially sharp. Refrigerator and washer output increased six-fold from 1939 to 1951.

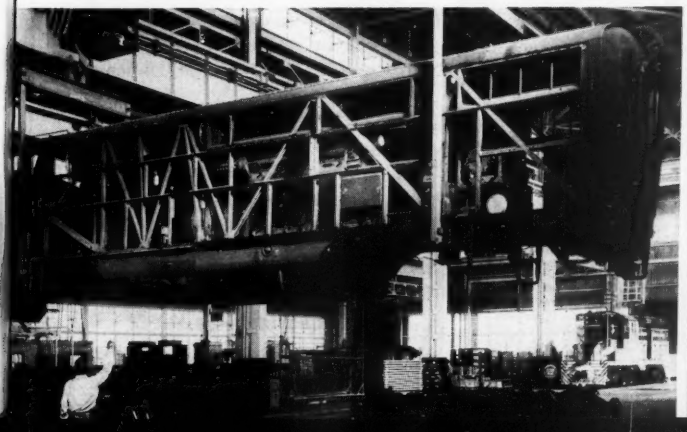
Aircraft—Defense production is relatively just as important in the Canadian economy as in the states. One of the dominion's major pro-



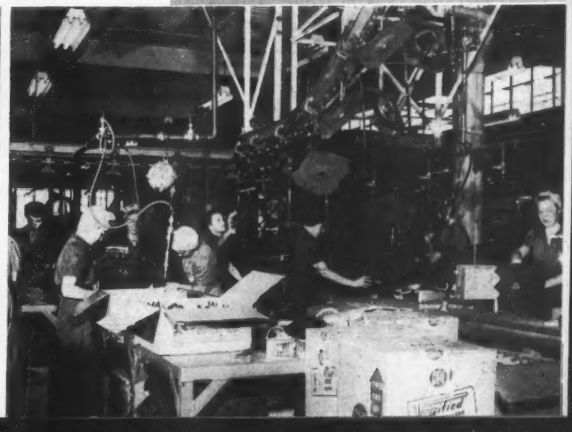




Diesel locomotive body is lowered onto trucks at General Motors London, Ont., plant. Opened in late 1950, the plant is turning out a dozen diesel locomotives a month



Automobile heaters are assembled at Eaton Automotive Products Ltd., London, Ont. Plant is a subsidiary of Eaton Mfg. Co., and is producing about 40 automotive parts



grams is to increase current production of aircraft by 1000 per cent by year's end. At the sprawling plant of Canadair (subsidiary of Electric Boat Co.) on the outskirts of Montreal, the Dominion expects to produce 2500 F-86 jet fighters, T-33 jet trainers and T-36 trainer-transports in 1953. Contributing are some 120 subcontractors and 1000 suppliers.

U. S. Participation — Dollars

U. S. INVESTMENT

IN CANADA

1951	$7.3 billion
1950	$6.6 billion
1949	$5.9 billion
1948	$5.6 billion
1947	$5.2 billion
1946	$5.1 billion
1945	$4.9 billion
1939	$4.1 billion

U. S. EXPORTS

TO CANADA

	Ferrous and Ferrous Products	Nonferrous and Nonferrous Products
1951	$1,146 million	$192 million
1950	811 million	135 million
1949	794 million	121 million
1948	713 million	109 million
1947	725 million	120 million
1946	467 million	84 million
1945	374 million	65 million
1944	419 million	83 million
1943	411 million	86 million
1942	368 million	60 million
1941	410 million	65 million
1940	273 million	44 million
1939	128 million	23 million

U. S. IMPORTS

FROM CANADA

	Ferrous and Ferrous Products	Nonferrous and Nonferrous Products
1951	$169 million	$278 million
1950	136 million	267 million
1949	108 million	196 million
1948	92 million	166 million
1947	57 million	100 million
1946	31 million	98 million
1945	48 million	214 million
1944	46 million	156 million
1943	47 million	170 million
1942	32 million	159 million
1941	14 million	92 million
1940	5 million	67 million
1939	3 million	132 million

from south of the border are playing an important part in all of these developments. Nonresident ownership in manufacturing enterprises varies widely. At the beginning of 1951, United States ownership in Canadian manufacturing was about 37 per cent of the total. In metalworking activities the percentage of United States ownership is substantially higher. Most of the capital in the Canadian auto industry came from the United States.

The United States also has a 35 per cent stake in Canadian mining and smelting enterprises. In 1950, U. S. investment in Canada's petroleum industry amounted to 54 per cent.

Industry Welcomed — Canada has extended an inviting hand to American manufacturers looking for expansion sites. And many American manufacturers believe they get a better shake in Canada than in the United States.

Corporate income taxes in Canada are high—52 per cent tops. But Canada imposes no excess profits taxes, no capital gains taxes and is lenient in its treatment of new enterprises.

The Dominion is realistic in its financial policies and a few weeks ago happily reported its sixth consecutive budget surplus. Canada's national debt, which soared to $13.5 billion during the war has been whittled down by about $2.3 billion.

Canadian government officials are firm believers in private enterprise and private competition. At the same time, the Dominion has a broad program of social security and the government participates financially in many development enterprises.

The Helping Hand—In the industry-rich Toronto area on Lake Ontario, American manufacturers looking for plant sites will get help from the Toronto Industrial Commission. T. H. Bartley, general manager, points with pride to some 400 United States-owned manufacturing companies in his district. Last year the commission helped industry obtain 1153 acres for sites, including one 430-acre site for Ford Motor Co.'s new plant.

Forging turbo-jet blades at Canadian Steel Improvement Ltd., near Toronto. Company is managed by Steel Improvement & Forge Co., Cleveland, which was invited to build in Canada to aid the Dominion's aircraft industry

When the Canadian government embarked on its current aircraft program, it wanted all important parts to be built in Canada. Lacking were forging facilities for turbo-jet blades and buckets. Looking across the border, Dominion officials asked Steel Improvement & Forge Co., Cleveland, to build a plant in Ontario. Canada put up the capital.

Seaway Troubles—The one thing that is making Canadians unhappy today is the slowness of the United States to get going on the St. Lawrence seaway as a joint project. Any Canadian can work up a few degrees of temperature discussing the lack of action on the project.

Now they are determined to go ahead on their own to develop both the seaway and the power projects if the United States continues to dawdle.

To Canadians, the seaway is important for full development of the Labrador-Quebec ore range, for further industrial expansion and for better exploitation of Canada's foreign trade. The power project would provide additional millions of horsepower for Canadian-located industry.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, Write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Order

RETAILERS—Amendment of May 9, 1952, of NPA Order M-89 adds these items to the list of controlled materials available to retailers who customarily sell them to the general public: Aluminum weatherproof wire for electrical conduction; copper-clad steel wire, which frequently is used for electrically charged stock fencing; galvanized corrugated roofing, and steel spikes and brads. To obtain these items and others in Schedule I of M-89, the retailer uses allotment symbol W-5. Otherwise, the retailer may use this allotment symbol to buy only the shapes and forms of controlled materials he sold during the calendar year of 1950. The amendment, which was effective May 9, removes steel fence posts from the list in M-89, and retailers can no longer obtain them with the W-5 symbol. Such posts now are purchased as a "B" product.

Price Regulation

DIAMOND PRODUCTS—Supplementary Regulation 7 to Ceiling Price Regulation 30 permits manufacturers of diamond grinding wheels, diamond powder and diamond grinding compound to reflect in their prices part of the increases in cost to them of crushing boart and diamond powder occurring on or before July 1, 1952. The cut-off date provides time for the increased prices of crushing boart to become fully effective at all levels. SR 7 was issued May 12, 1952, made effective May 17.

Hot Extrusion Press Installed

A hydraulic press to hot extrude steel under the Ugine-Sejournet process is being installed at the Watervliet, N. Y., plant of Allegheny Ludlum Steel Corp.

This press was designed and built by Lake Erie Engineering Corp., Buffalo.

The press, which will be used to produce alloy steel solids and hollows, including tubes, has a total working force of 1800 tons. It accommodates billets up to 7.5 inches in diameter and 24 inches in length. Dies can be changed rapidly and abrasive wear is held to a low level.

What Country Needs: Nickel

This country needs a good nickel cigar, a good 5-cent nickel and just plain nickel. National Production Authority announced its first separate nickel-bearing stainless steel quarterly allotments.

NPA has allotted 4 million pounds of the metal to the Consumer Durable Goods Division for reassignment to manufacturers for the third quarter. Of that total, 3,785,535 pounds has gone to producers, with the remainder held in reserve for supplementary allotments. Nickel-bearing steel formerly was lumped with non-nickel-bearing chrome, now decontrolled.

By agreement with the International Materials Conference, the U. S. receives more than two-thirds of the free world's supply of nickel, or about 52 million pounds for second quarter. Approximately 70 per cent of it goes directly into military production.

The government has activated the Nicaro plant in Cuba and expects to produce up to 30 million pounds a year by 1953. This will supplement the nickel imports upon which this country relies.

Uncontrolled Tin Products Urged

All secondary tin mill products should be placed on an uncontrolled list starting with third quarter, 1952, is the recommendation of the Tin Plate Advisory Committee to the Commerce Department.

The committee also recommends that export controls on secondary tin mill products be ended if domestic controls are relaxed, except where security is involved. Recently, a 12,500-ton increase in the second quarter export quota for secondary tinplate products was announced by the OIT, bringing the total second quarter export quota to 75,000 tons.

Quick action on suspension of controls over all secondary tin mill products was urged by the committee "as soon as possible" to free these products in time for buyers to make their purchases for the Christmas toy trade and other purposes.

Procurement To Sprint Through $21 Billion

DEFENSE procurement is going at a good clip, and a quick speed-up of purchases is expected from April until July.

As of Apr. 1, 1952, a total of $21.5 billion of the funds for fiscal 1952 (July, 1951-March, 1952) were left unobligated. Of this $16.6 billion was available for hard goods, $0.8 billion for soft goods and $4.1 billion for construction. The Defense Department says it expects to use the bulk of these funds during the remaining three months of the fiscal year.

During the first nine months of fiscal 1952, the Defense Department obligated $29.1 billion for procurement of major equipment, supplies, military construction and expansion of production facilities. Of this total, hard goods amounted to $24.2 billion, soft goods totaled $3.3 billion and $1.6 billion was obligated for construction. Of the $24.2 billion hard goods total, $2.4 billion is under the MSA.

Since the attack on Korea, $118.3 billion in obligational authority was given to the Defense Department, $70.6 billion for hard goods procurement, $8.2 billion for soft goods and $7.5 billion for construction.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $250,000 in value.

PRODUCT	CONTRACTOR
Vertical Boring & Turning Mill	Consolidated Machine Tool Corp., Rochester, N. Y. King Machine Tool Div., American Steel Foundries, Cincinnati
Tractors, Warehouse Electric	Mercury Mfg. Co., Chicago
Trucks, Fork Lift	Clark Equipment Co., Buchanan, Mich.
Aircraft Parts	Bendix Aviation Div., Bendix Aviation Corp., Detroit
Coolers & Valves	Clifford Mfg. Co., Waltham, Mass.
Valves, Spares	Cornelius Co., New Brighton, Minn.
Pumps	Lear Inc., Romec Div., Elyria, O.
Shells, 75 mm	David Bradley Mfg. Works, Bradley, Ill. Peerless of America, Chicago
Feed Mechanism, 20 mm	Sunbeam Corp., Chicago
Fuzes	Speed-O Print Corp., Chicago Dole Valve Co., Chicago
Electron Tubes	General Electric Co., Schenectady, N. Y.
Telephone Switchboards	North Electric Mfg. Co., Galion, O.
Inverters	Bendix Aviation Corp., Detroit
Hydraulic Gun Chargers	A-P Controls Corp., Milwaukee
CW Sampler Units	Ralph N. Pearson Co., Los Angeles
Parts for Detector Sets	General Electric Co., Schenectady, N. Y.
Sound Ranging Sets	Cambridge Instrument Co. Inc., New York
Radio Direction Finders	Baker & Ford, Bellingham, Wash.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Administration officials would like to see Point Four aid assumed by private investors not subject to congressional whims. But European investment has some pitfalls

STATE DEPARTMENT and other administration brass hats have concluded that it will not be safe to base the long-range Point Four program of technical assistance to foreign countries upon government spending. The reason: Whereas Congress at any time could order termination of public spending on Point Four, private investments abroad would not be subject to the same criticisms.

So the big activity under Point Four now is to develop ways and means of encouraging American private investments abroad.

Teeth To Be Pulled—This objective will not be easily achieved. Most countries have laws and policies that repel rather than attract foreign investors. In some countries, for example, when you employ a worker for a certain number of months he becomes your legal responsibility and you have to pay him regularly whether you use him or not.

Many countries have high prevailing interest rates on business loans—as high as 2 to 3 per cent *a month*. In some you have to pay import tariffs on machinery necessary as basic capital equipment. Many prohibit or limit the exportation of profits. And these are only a few examples of the difficulties!

Open Wide, Say Ah-h-h—State Department officials realize that it will take time and steady plugging to develop a climate abroad that will be favorable to American investors. In the meantime, the program continues to be pushed.

The Office of International Trade now is looking for some 60 men with backgrounds in industry and transportation. These people will be given industrial and transportation assignments abroad. Interested parties can get two informative documents by writing to the TCA Reports Office, Department of State.

One of them lists the directors assigned to the individual Point Four countries to supervise technical assistance programs. The other lists and describes the specific technical assistance programs in which we are participating in 32 countries.

WATCH YOUR STEP!
. . . pathway to profit has snares

SDPA, Good Agency To Know...

If you have not done so yet, you should visit the nearest regional office of the Small Defense Plants Administration and get acquainted. Under its statutory authority, SDPA has effected arrangements with the armed services whereby it will study all requirements to be purchased by the various procurement offices and designate those that must be placed with small business.

Incidentally, SDPA is looking for men with business experience who can help in this work of steering defense business into the shops of small business. It wants to hire about 100 such men.

Castings Shipshaping Up . . .

Maritime Administration spokesmen report an improvement in procurement of heavy forgings and castings for the machinery of the 35 Mariner-type ships now under construction. Several months ago the difficulty in obtaining these components threatened the shipbuiding program; now the situation, although not yet entirely comfortable, is no longer critical.

If the Air Force succeeds in its present effort to obtain large castings and forgings in Germany for its heavy press program, the procurement situation at home should improve further.

An Ounce of Intervention . . .

Trend toward enlarged federal controls over business was boosted when the Senate on May 7 passed the Mine Safety bill. This bill, still to be acted on by the House, permits the Secretary of Interior to fix safety standards and empowers federal inspectors to close down a mine classed by them as unsafe. Senators from the coal states declared in presenting the bill that enforcement of state laws and voluntary compliance with these laws has failed to halt preventable mine disasters.

Fair Trade Weather Stormy . . .

Prospects for the so-called Fair Trade bill are not considered good even though the House voted for it 196 to 10. The Senate Commerce Committee may refuse to report the measure. Also, presidential veto is indicated by Federal Trade Commission opposition. The FTC said its effect would be to permit price-fixing that would add billions of dollars to prices.

No Investigation Needed . . .

Rumor has it that some of the steel beams in the rebuilt White House bear the mark "U S S R." They were supposedly rolled for the Russians and found their way into a warehouse where they were picked up for the White House job. According to the contractors, there isn't any truth whatever in this report. One of the men employed on the job merely stretched his imagination on observing that some of the beams were marked "U S S—United States Steel."

McKAY

PRESS FEED AND CUT-UP LINE

A New Answer to
COIL FEEDING
Problems

Incorporating the latest in D.C. drive and control, McKay's *new* feeding line provides high production with extreme accuracy. Typical rugged construction insures minimum maintenance.

1
Cone Type Coil Holder handles heavy coils, allowing a wide range of inside diameters. Hydraulic lift and centering of coil included.

2
Pinch Rolls with D. C. drive furnish positive payoff of strip to storage loop.

3
Storage Loop controlled by Photoelectric Equipment.

4
4-Hi Seven Roll Leveler with entry and exit pinch rolls — all rolls individually driven from totally enclosed gear case.

5
D. C. "Planer Type" Variable Speed Drive insures high speed feeds and accurate lengths.

6
Measuring Device with positive drive from separate measuring rolls eliminates errors in length due to slippage.

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McK

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

"Tycol Afton keeps cutting edges cool... lengthens tool life between grinds"

Right! Tycol Afton Cutting Oil steps up tool performance . . . allows closer tolerances and finer finishes.

It makes fast, free cuts possible—reduces spoilage and the need for frequent regrinding.

Tycol Afton is a "dual purpose" oil, used for both cutting *AND* machine lubrication. Several grades are available for use on any specific machine tool.

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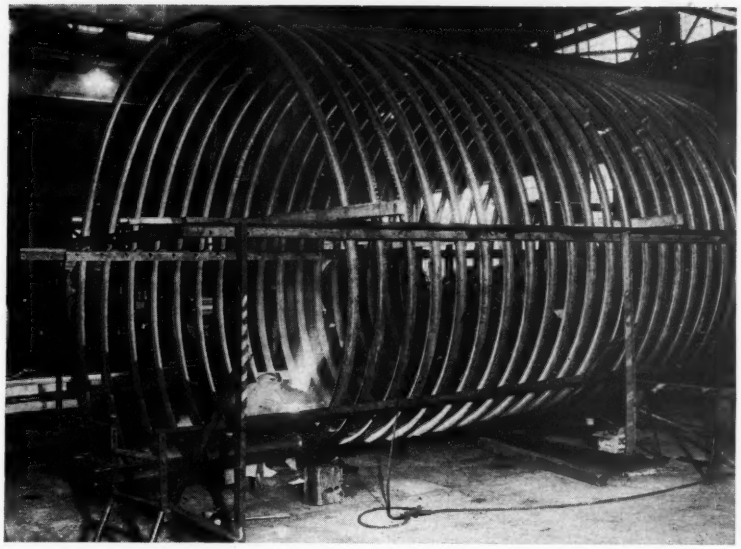


Boy Meets Coil

Twenty-foot lengths of extra-heavy, 3-inch, seamless iron pipes are here being welded with General Electric Co. electrodes to form a heating coil. Only half-completed, it will be used inside a processing tank at the Newark, N.J., plant of the Steel & Alloy Tank Co., manufacturers of industrial processing vessels

NPA in Middle on Electrical Standards Fight

The agency was about to issue an order requiring that all equipment makers conform to machine tool builders' electrical standards when auto men and other buyers protested

NPA FOUND it had a bear by the tail as it readied an order which would make the electrical systems of all metalworking equipment conform with the standards adopted by the National Machine Tool Builders' Association.

It reckoned without the Joint Industry Conference, a loosely knit group composed principally of equipment users, especially automakers. JIC has developed its own electrical standards and strongly objects to being forced to accept NMTBA's.

Postponed—NPA's order, M-105, was to have been issued Apr. 1, then May 1, but is still on the shelf. Under M-105 all new metalworking equipment would follow NMTBA electrical standards, even though many types of apparatus so covered are outside the scope of the association's members. Any equipment built in deviation from those standards would have required prior NPA approval. A buyer who refused to take delivery on machinery built to those standards would lose his turn on the builder's order board.

Because many machinery users, electrical component manufacturers and even a few machine tool manufacturers conform to JIC electrical standards, the proposed M-105 would force all those people to apply to NPA for permission to use JIC standards or change completely to NMTBA's setup.

Strong Arguments—Both sides have good points to support their positions. NMTBA members say their standards are simpler and mean less expense than JIC's. Equipment conforming to their standards can be built more quickly, they claim. What's more, they charge that JIC is unduly influenced by the automakers. "It's as though equipment men were to write out specs for automobiles," one machine tool man says.

JIC's position is that the equipment buyer surely should have some say about electrical standards since he's using the machine, not the builder. JIC claims that automakers have the right to influence specifications because they are the largest buyers of equipment in the country. JIC believes its standards, while more complex and initially more expensive than NMTBA's, are in the long run less costly, more conserving of manpower and materials and permit sustained high production rates. It claims its standards allow easier maintenance and are safer.

False Economy?—JIC advocates charge that adoption of M-105 would hinder their safety and production programs more than the increased flow of equipment would help them.

As a result of the protests by JIC, NPA has its controversial order under review now. The final result may be this: A modified M-105 that would allow equipment builders to manufacture according to either NMTBA or JIC standards.

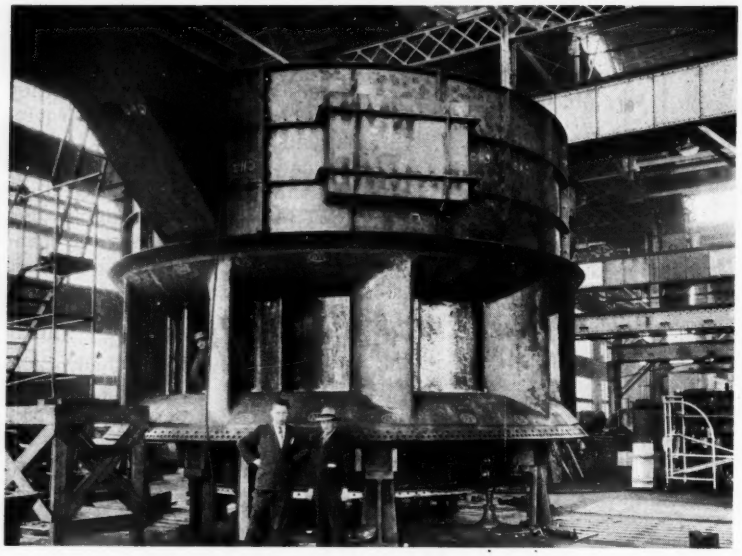
Screw Parts Flow, But—

Screw machine shops nervously eye storm signals on the horizon though business is good

FIRST QUARTER shipments were the largest since World War II; defense orders are high; most materials are readily available, but executives of screw machine product shops are worried.

N. A. Hewitt, president of Ohio Screw Products Inc. and of National Screw Machine Products Association which just held its annual meeting in St. Louis, says, "Storm signals are appearing on the business horizon. Order backlogs have been declining slowly but steadily for more than a year. Defense volume is slipping, although it's still nearly half our total production."

Fast Storm—"Storms come up in this business as fast as twisters in Oklahoma," says Orrin B. Werntz, executive secretary of the association. He remembers what happened in 1949. In 1948, the jobbing industry had a good year, with profits at about 9 per cent of sales. Within 12 months the business recession of 1949 had whittled the industry's profits to a mere 2 per cent of sales. The 1951 profits compared favorably with the 1948



Turbine Parts: Massive but Precise

This assembly of stay ring, turbine gate and operating mechanism goes with one of the six 62,500 hp turbines built by Baldwin-Lima-Hamilton Corp., Philadelphia, for the Corps of Engineers' Wolf Creek plant in Kentucky. Though massive, machine work on the parts nevertheless must be accurate to insure smooth operation

performance. Earnings were good in the first quarter this year. Can they continue?

The question arises because of the unusual nature of the industry. Its volume gyrates so markedly because of the large number of captive screw machine departments. Some 1600 companies in the U. S. whose prime business is the manufacture of products other than screw machine parts have captive screw machine departments equipped with 18,000 to 20,000 machines manned by 28,000 men. Some 1800 independent shops have about the same number of machines and the same employment.

When business gets more difficult, those companies with captive departments—many of whom also are customers of the independents—pull in their outside jobs.

Another Tempest—Most captive departments are designed for production of few specialty products on a big scale. The independents are better equipped for diverse production. Because the captives are usually owned by large corporations, they often can buy equipment on a grander scale than the jobbing shops. As a result, machine tool builders are more interested in the big sales, and lately the independents have had trouble getting new screw machines.

The captive situation has contributed toward keeping the jobbing industry small. A company employing more than 100 is big, according to National Production Authority definition. The same factor, plus taxes, also has spurred company liquidations in the jobbing sector of the industry. Mr. Werntz says that "more screw machine companies have closed their doors—but not failed—in the past 12 months than at anytime since the end of World War II."

If the first quarter pace could continue, the jobbing shops would turn out more than $500 million worth of screw machine parts in 1952 alone.

Few expect such a record year —the association estimates $440 million for 1952, compared with $220 million in 1947. The dollar spread between those two figures looks impressive, until you remember a 30 per cent inflation has occurred since 1947. The actual number of machine-hours performed in 1947 and 1952 will not be greatly different.

Taxes Crimp Sheet Growth

Sheet metal distributors see a continued high business volume but low profits curb expansion

"SALES UP, taxes up, profits down" to the tune of the "Missouri Waltz" was the refrain as the National Association of Sheet Metal Distributors met in Pittsburgh.

The industry expects a continuing high rate of business activity into the middle of 1953 despite a closer supply-demand balance. But don't expect any marked expansion under present conditions. Howard Williams, Continental Steel Corp., Kokomo, Ind., in giving the galvanized sheet picture explains why.

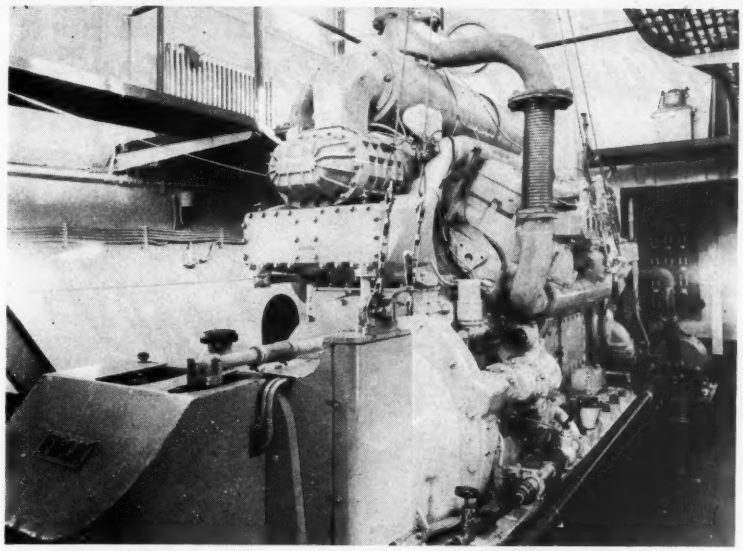
Familar Tune — "Industry expects to make a reasonable return on its investment and expects to stay in business during competitive times. We now have a real battle on our hands trying to figure out how to continue production of galvanized sheets at a fair profit. No special effort can be made to increase production of a product when the margin of profit is questionable," he pointed out.

A. W. Robertson, chairman of Westinghouse Electric Corp.'s finance committee, told convention-goers that "business for profit is a game which may need a referee, but it is in no sense the evil, anti-social activity" government is now claiming it to be.

Discordant Melody—In opening the sessions of the convention, its president, Alexander Thomson, also president of Tanner & Co., Indianapolis, stated that government controls in the steel industry have done nothing but dislocate steel all over the country and cut business.

Strange Scoring—He cited examples to support his charge that Washington is buying more steel than it needs.

"In one order the specifications called for an unusual amount of oil and other protective coating. We found out later that it was because Washington didn't intend to use the steel for ten years. In another case, I saw almost 10,000 tons of steel plate piled rafter-high in warehouses. When I asked the government man what it was for, he said it was for ships not yet in the blueprint stage."



Seagoing Caterpillar Is No Sea Serpent

A Caterpillar Diesel D397 marine engine powers the towboat *A. E. Dyke* operating out of Pittsburgh. The boat is 74 feet long with a 20-foot beam and a 7½-foot draft. A D311 Diesel electric set provides auxiliary power when needed

Selling Is No Longer a Cinch

After years of war and war mobilization, many companies are finding sales are not so easy, orders are not coming in over the transom. Sales efforts get a re-examination

DO YOU HAVE a 1952 plant and a 1939 sales force?

Baker-Raulang Co., Cleveland, materials handling equipment maker, found that it had and then did something about it. Regional vice presidents in charge of sales, service, and training were appointed; staff men were added to the home office to co-ordinate national account sales; inside sales-engineers were hired to help with tougher engineering problems, and attention was concentrated on new sales aids, such as up-to-date brochures, films and slides. Baker-Raulang's target for 1952 civilian sales is up 100 per cent over 1951.

Behind the Facts—While selling is not a new problem, management is concerned currently because they're not sure how much of today's slow sales are due to outmoded, atrophied sales efforts.

Common recourse of many companies facing the selling problem is to outside help. They want a fresh look at their "good enough for wartime" sales setups from management consultant firms, market research firms or sales analysers.

Here are some results of the increased sales-consciousness:

Advertising is switching from institutional to productive veins; fewer pot-warmers; more "sell" for particular items. Sales aids are being improved, in some cases for the first time in 12 years.

Salesmen are being dusted off for the first time in years, too. Though not many new men are joining the ranks, they're going back to training schools to learn more about the product and to "think in terms of the customer's wants." More sales-engineers are being added—when they can be found. Bryant Heater Division, Affiliated Gas Equipment Inc., Cleveland, has instituted a two to three month sales-engineering program.

Dealerships and distributorships are being re-examined for their effectiveness. L. H. Loufec, sales manager of industrial equipment, Westinghouse Electric Corp., Pittsburgh, says, "We are trying to establish more distributor outlets and have a very comprehensive program aimed at getting them."

Service and follow-up are becoming common words in the sales department again. Lewis-Shepard Products Inc., Watertown, Mass., has just completed a service school which was attended by their leading service managers across the country. That was regarded as "one of the best methods to coordinate sales efforts while at the same time giving their representatives a first-hand knowledge of new products."

Manufacturers are not deluded by big defense backorders. Forward looking firms are streamlining sales forces now to meet the needs of 1953 and '54.

New Products Unveiled

Houses that need no upkeep and paper made of glass fibers are not fantastic dreams. They are developments being perfected by the ceramic industry.

Paper made of glass fibers was demonstrated at the 54th annual meeting of the American Ceramic Society in Pittsburgh. The product won't burn and is as weatherproof and lasting as glass.

William Coates, a construction engineer associated with Austin Co., Cleveland, revealed that the University of Texas and private industry have developed a $10,000 house that never needs repairs. The half-million dollar research program which developed the dwelling was conducted under Mr. Coates' direction.

The repairless house is built of ceramic materials—brick, tile and similar substances—plus metal doors and windows.

"The research that went on in Austin was non-profit," Mr. Coates said, "and the results are available to any one."

Portable Houses Today's Tempo

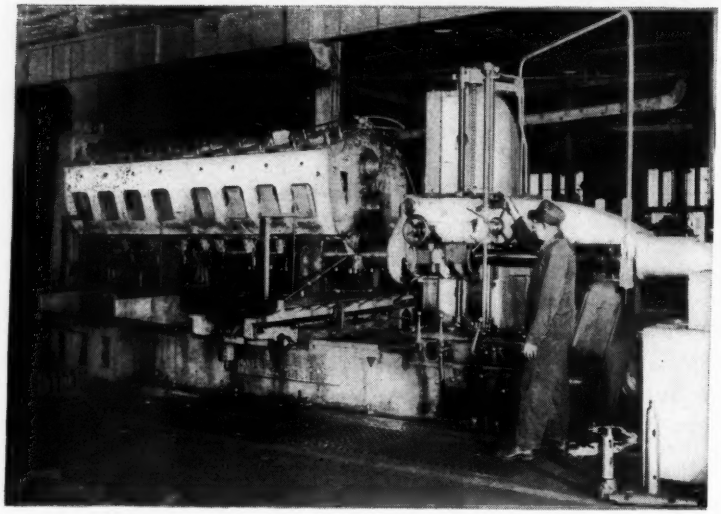
A portable house that can be moved on a flat-bed truck trailer or railroad flat-car and erected on a new foundation in less than two hours is announced by Pressed Steel Car Co., Hegewisch, Ill. The five-room unit is constructed entirely of laminated stressed-skin plywood, costs less than $8000.

a Boring plus Performer*

FOR

Diesel

CRANKSHAFT BEARINGS



*And Now

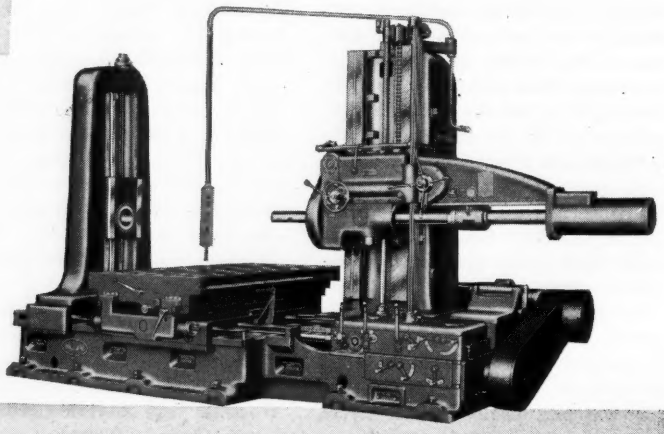
BETTER PERFORMANCE

with

1. Broad Rigid 4-WAY bed
2. Heavier box type saddle and table.
3. Motor-driven lubricating pump for the gear boxes.
4. Improved hydrodynamic main drive.

Here is a typical example of the adaptability of the Horizontal Boring Machine for a wide range of Diesel shop requirements. This 5" machine, installed in a large mid-western shop in 1946, is shown boring a Diesel frame for crankshaft bearings using a 6" dia. x 16' bar and employing five tools at the same time. It has been used exclusively for this work for the past two years.

The new redesigned Bullard Horizontal Boring Machine is equipped to provide still higher standards of maintained accuracy and more versatile performance. The new heavier design, features a massive 4-WAY bed, motor-driven lubricating pump for the gear boxes, improved hydrodynamic main drive and other important improvements. Write for complete details or better still, have a Bullard man tell you what a Bullard Horizontal Boring, Milling and Drilling Machine can do for you in your own shop.



THE BULLARD COMPANY

Bridgeport 2, Conn.

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

ALUMINUM DISTRIBUTION IN PASSENGER CAR INDUSTRY

	Feasible Aluminum Applications per Car LBS	1950 Consumption LBS	1954 Estimated Consumption LBS
PISTONS	13.0	60,670,000	65,000,000
CYLINDER HEADS	44.0	4,570,000	23,400,000
CYLINDER BLOCKS, CRANKCASES	65.0	None	19,500,000
CLUTCH HOUSINGS	5.0	1,330,000	5,000,000
TORQUE CONVERTERS	25.0	16,670,000	25,000,000
TIMING GEARS	2.0	667,000	3,000,000
RADIATORS	13.0	None	15,000,000
WIRING	2.5	None	4,000,000
CARBURETORS, FUEL PUMPS	2.5	1,330,000	10,000,000
VALVE COVERS, MANIFOLDS	10.0	667,000	3,000,000
BODY TRIM	5.0	3,330,000	10,000,000
BEARINGS	0.2	None	1,500,000
BRAKES	24.0	2,000,000	7,000,000
TUBING	3.0	None	1,000,000
MISCELLANEOUS	2.0	6,667,000	9,000,000
TOTALS	214.3	97,901,000	201,400,000

Competition in auto circles may lead to radical changes soon. One shift may be to aluminum. Alcoa is pushing the metal and hopes for a marked increase in use by 1954

DETROIT

THE STEADILY mounting competitive tension among auto builders may result in some radical engineering changes soon. One could be a more marked trend toward aluminum.

Aluminum producers are pushing the light metal in Detroit today, even though there's not enough of it to go around now among the established consumers. That's because of the long time lag between the time an engineering idea is approved and when it is placed in production.

Two Years Ahead — Aluminum Co. of America is figuring 1954 as a target date for a greatly increased use of aluminum in autos. By that time, it believes plenty of aluminum will be available. Frank Jardine, manager of Alcoa's Development Division, has calculated the potential consumption of aluminum in 1954 (see the table). He points out that where exact data are not available, "these are our best estimates or guesses," but his reputation is one of conservatism rather than overoptimism.

He indicates that on the basis of feasibility more than twice as much aluminum can be consumed by the passenger car industry in 1954 as in 1950. This does not mean that each new car will contain the 214.3 lbs. which he regards as a potential nearby total. If each one did, and assuming a five-million-car year, the aluminum requirements of the industry would be more than five times as great as Mr. Jardine envisions them above. Amounting to 535,750 tons, these needs would overwhelm the then-vastly expanded aluminum capacity, taking up about one-third of its production.

Precedence—For many of the automotive applications figuring in Mr. Jardine's compilation there is sufficient precedent to make his predictions entirely believable. The piston aluminum requirement, for example, can be accounted for merely by the switch-over by Chevrolet and Pontiac from gray iron.

Expanding use of torque converters and their use of aluminum, in which most were originally designed, would seem to make the 1954 total for this application within easy reach. Several of the other increases in use appear equally likely. Aluminum cylinder heads now offered as optional by a few carmakers to give higher engine compressions show a large potential by 1954, according to Mr. Jardine's figures.

The jolts come particularly from three items in his listing—aluminum cylinder blocks and crankcases, valve covers and manifolds, and radiators.

Modest Total—On the basis of the consumption figured by Mr. Jardine, the indication is that 300,000 passenger cars may be equipped with aluminum engines in 1954. Any two of the medium-size independents would account for about that total.

One independent company whose work with aluminum engines is relatively far advanced is Kaiser-Frazer. Another whose interest is considerable is Nash. The aluminum engine's possibilities, however, are not unknown to the big three, nor to the other independents. General Motors has two experimental cars with aluminum engines, Le Sabre and the XP-300.

It may well be that the development of a practical passenger car engine of aluminum could launch an outsider into the industry on a catapult. McCulloch Motors Corp. of Los Angeles, which has a three-cylinder, two-cycle opposed-piston air-cooled engine of 125 horsepower built up of aluminum die castings, should not be overlooked as a potential competitor or supplier.

Possibility — It's possible that some relatively small automaker may seize on an engine design which will be suitable for several different cars and may set itself up as an engine source. One of the designs built experimentally has the happy faculty of flexibility which might be needed in such an event. Cast in vertical sections which divide at about the midline of the cylinders, this engine would require two end sections and two midsections to make a V-6, three midsections for a V-8, etc. The middle portions would be duplicates and would lend them-

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selves to automatic molding in quantity.

It is the automaticity of such an operation, plus the elimination of much machining and intricate coring necessary for gray iron engine components, which aluminum men believe can lick the bugaboo of metal cost. It is their belief that aluminum engine parts can be either permanent molded or die cast if the demand will warrant the expense of the machinery. One man sets the cost of necessary die casting equipment at about $2 million.

Side Benefits—An aluminum engine in passenger cars foretells other significant opportunities. In cutting down weight importantly, the need for power of today's magnitude is also reduced. A 1954 car containing all the aluminum applications regarded as feasible by Mr. Jardine could get along nicely with a much lower horsepower rating. Correspondingly, the engine's physical size would be under today's standards and the passenger compartment of a car with today's over-all length could be much larger. Inclusion of an aluminum radiator might necessitate distinctive departure from the present front-end treatment.

New ideas in suspensions, particularly in the direction of torsion bars, could make possible a lengthened wheelbase in a smaller over-all length with no sacrifice in roadability or riding comfort.

Chrysler To Operate Arsenal

Chrysler Corp. got the nod from Ordinance and has been picked to operate the Detroit arsenal. The tank-producing facility at Center Line, Mich., has been the center of lots of controversy; employees and many Ordnance officials contending that a private operator in this instance could not match the low costs at which they are currently producing M-47s, and the Army saying that the plant under government direction is not meeting output quotas.

Chrysler was approached along with other automakers about two months ago and submitted a proposal on how the transfer could best be effected. It will not take over the research and development programs of the arsenal nor the national gage and inspection programs being carried on there.

Gould Opens Battery Plant

A new $1.1 million plant at Monroe, Mich., was opened last week by Gould-National Batteries Inc., St. Paul, as one more step in its $7 million expansion program which will include new plants at Kankakee, Ill., Fort Erie, Ont., and St. Paul. To be used initially for production of Air Force and Army Ordnance batteries, the facility is designed for auto battery production with only minor changes. Gould will reach for a larger share of the original automotive battery business when the emergency passes. It now supplies only one carmaker.

Nance Heads Packard

Selection of James J. Nance as president and general manager of Packard Motor Car Co. indicates that some radical moves can be expected. Thought of particularly as a merchandising specialist, Mr. Nance has been president of Hotpoint Inc., a General Electric affiliate, since 1946 and is credited with the spectacular growth of that organization. He had earlier been with Frigidaire Division of General Motors as manager of the commercial department, a post he left to serve on the War Production Board during World War II.

Auto, Truck Output
U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,692	658,918
March	517,206	792,550
April	569,504*	680,281
May		695,898
June		653,682
July		522,858
August		571,442
September		505,758
October		558,971
November		480,199
December		402,729
Total		7,179,161
Week Ended	1952	1951
April 12	123,180	162,839
April 19	131,657	166,502
April 26	135,769	162,740
May 3	130,108	154,523
May 10	131,434	180,577
May 17	132,000*	158,502

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

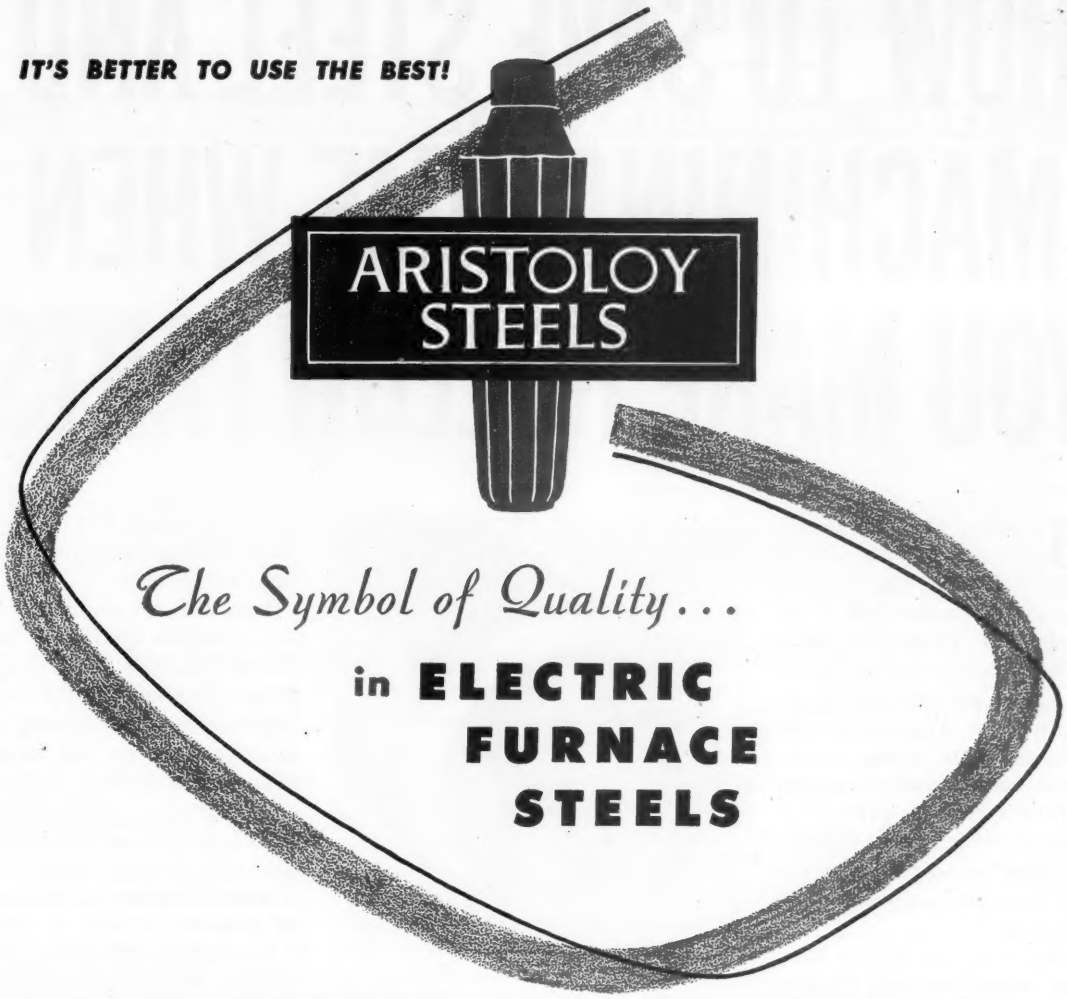
JAMES J. NANCE
. . . new Packard president

Most intriguing of the speculation about Packard's future plans under Mr. Nance's leadership is that in time the company will be a producer of a revolutionary small, light car. Some believe Packard's Pan American sportscar, first shown at the International Motor Sports Show in New York in March, fits into the picture in one of two ways—it is a smoke screen for the work on the small car, or it is an interim step being taken to try out some of the ideas which, if successful, will be incorporated in that vehicle.

In view of the reported interest of Packard in light cars, the trip to Europe by W. H. Graves, vice president of engineering, and Edward Macauley, chief engineer, Styling Division, takes on added significance. Chief target of their visit has been Italy where the production facilities of a carmaker whose vehicle contains an aluminum engine are understood to have come under scrutiny.

Mr. Nance takes the presidential reins from Hugh J. Ferry who becomes chairman of the board, a post unfilled since the resignation of Alvan Macauley in 1948. Mr. Ferry continues as treasurer. Henry C. Bogle, Packard general counsel, resigned his seat on the corporation's board so that Mr. Nance could join it.

IT'S BETTER TO USE THE BEST!



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Straightened • Cold Drawn • Machine Turned • Centerless Ground

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COPPERWELD STEEL COMPANY
WARREN, OHIO

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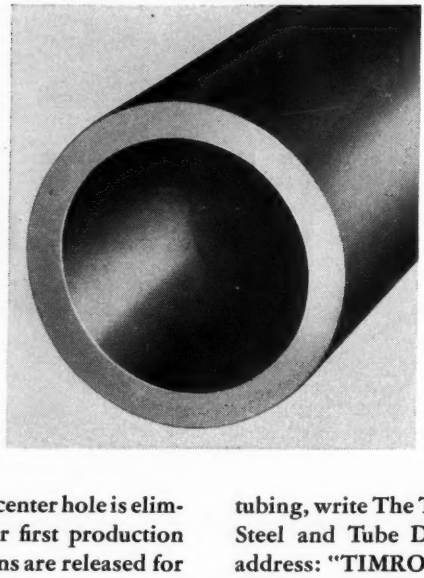
HOW TO SAVE STEEL AND MACHINING TIME WHEN YOU MAKE HOLLOW PARTS

BY using Timken® seamless tubing for hollow cylindrical parts, you save steel because the center hole is already there. There's less metal to be machined away, less scrap loss. You get more parts per ton of steel. And to help you get even more savings in material, the Timken Company offers a tube engineering service which recommends the most economical tube size for your job — guaranteed to clean up.



You save machining time, too, when you use Timken seamless tubing. Since drilling the center hole is eliminated, finish boring is often your first production step. Result: screw machine stations are released for other operations. You get added machining capacity without adding machines.

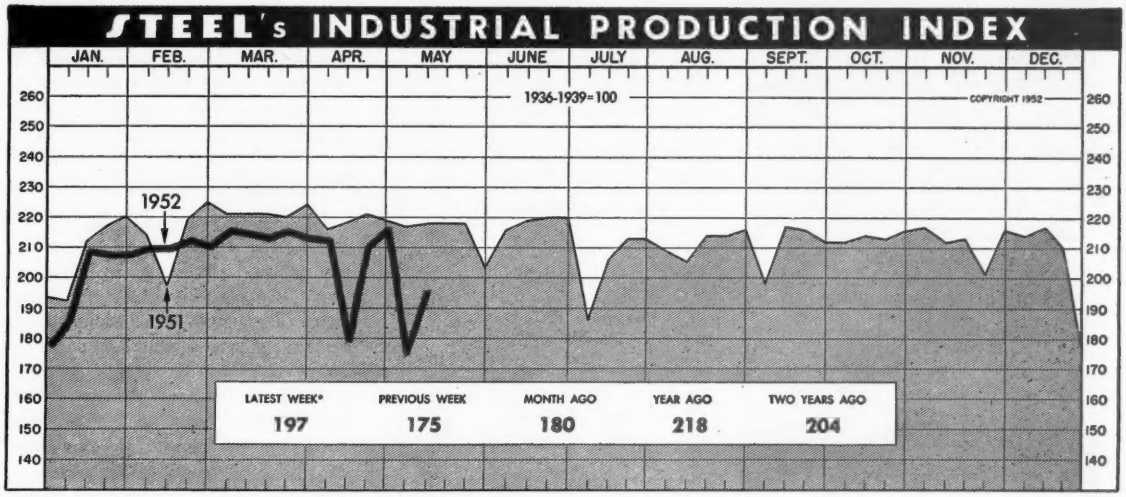
With Timken seamless tubing, product quality is improved. Because the piercing process by which Timken tubing is made is basically a forging operation, you get fine forged quality with greater strength and toughness. And this quality is uniform from tube to tube and heat to heat, due to the Timken Company's rigid quality control.

For more information about the use of Timken seamless tubing, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

The Business Trend


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1936-1939=100
COPYRIGHT 1952
260 250 240 230 220 210 200 190 180 170 160 150 140
1952
1951
LATEST WEEK* 197
PREVIOUS WEEK 175
MONTH AGO 180
YEAR AGO 218
TWO YEARS AGO 204

* Week ended May 10.

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

Activity index shows recovery from the steel work stoppage. How favorable business weather will be depends on how quickly and satisfactorily labor problems are solved

CAUTION is filling the business air these days.

Expect—Threatened by the possibility of a new round of industrial strikes, many metalworking executives are curtailing plans to expand facilities or boost employment. They are marking time until the outcome of the steel and oil muddles to see what they, themselves, might expect in wage demands.

Right now, most industries are continuing to run at fairly high production levels. Defense is still taking up a good deal of the slack in civilian demand, and military orders are expected to build up until 1953. So far, the two brief turn-offs of steel production had little effect on other industries' production schedules, and the petroleum strike hasn't hurt many manufacturers yet. If the labor situation eases in the next few weeks, we may still see favorable business conditions in the coming months of 1952.

Index Gains—Reflecting partial recovery from the second and more severe steel industry walkout, STEEL's industrial activity index in the week ended May 10 shot up 22 points to 197 per cent of the 1936-1939 average. That's about a half-way return to the reading for the week ended Apr. 26, just before the second walkout. Following a 30 point rise in ingot production, auto and truck production showed slight gains. Electric power generation rose slightly over the previous week's output, while freight car loadings—feeling the effects of the petroleum strike—dipped even further.

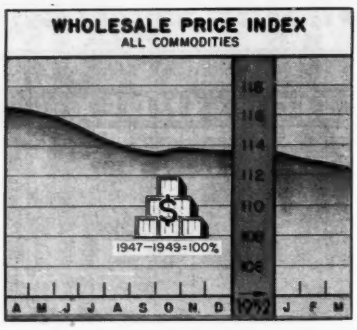
Auto Output Steady . . .

On the basis of present performance, the auto industry may turn out 1,250,000 passenger cars in the second quarter of 1952. In April, automakers brought production up to the highest levels since August, 1951. And the uptrend in daily output seems to be increasing. Of course, future production hinges on the results of the steel case. As it now stands, the auto industry is in a position to work throughout May and well into June, but a second-quarter goal can be reached only if the flow of steel is uninterrupted.

Ward's Automotive Reports estimates that U. S. and Canadian plants turned out 131,434 autos and trucks in the week ended May 10. That's a rise of more than 3000 units from production during the previous week and below output in the same week last year by some 27,000 units. Total car and truck production so far this year is lagging about 30 per cent behind the like 1951 period. This year U. S. plants turned out about 1.5 million cars and 461,000 trucks, compared to 2.3 million cars and 567,000 trucks in the like period, last year.

Buyers Pessimistic . . .

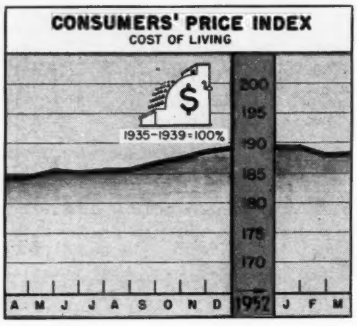
Purchasing men are somewhat pessimistic over present business conditions. Although defense production is still climbing, more buyers are reporting business conditions have eased. A survey by the Purchasing Agents Association of Chicago shows that, although the inventory decline of its members was no worse in April than in March, the backlog of orders has fallen sharply. Meanwhile, production and deliveries are rolling along at high levels, which may produce an overload of inventories of finished products. In several lines this seems to have happened. In April, buying policies within the 30 to 60-day period took



Wholesale Price Index
(1947-1949=100)

	1952	1951	1950
Jan.	113.0	115.0	97.7
Feb.	112.6	116.5	98.3
Mar.	112.3	116.5	98.5
Apr.	....	116.3	98.5
May	....	115.9	99.6
June	....	115.1	100.2
July	....	114.2	103.0
Aug.	....	113.7	105.2
Sept.	....	113.4	107.1
Oct.	....	113.7	107.7
Nov.	....	113.6	109.3
Dec.	....	113.5	112.1

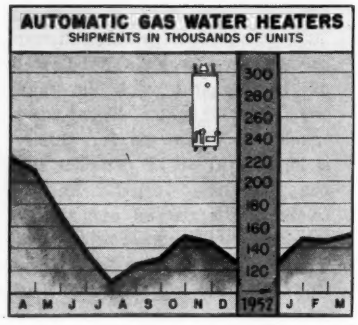
U. S. Bureau of Labor Statistics



Consumer Price Index
(1935-1939=100)

	1952	1951	1950
Jan.	189.1	181.5	168.2
Feb.	187.9	183.8	167.9
Mar.	188.0	184.5	168.4
Apr.	....	184.6	168.5
May	....	185.4	169.3
June	....	185.2	170.2
July	....	185.5	172.0
Aug.	....	185.5	173.4
Sept.	....	186.6	174.6
Oct.	....	187.4	175.6
Nov.	....	188.6	176.4
Dec.	....	189.1	178.8

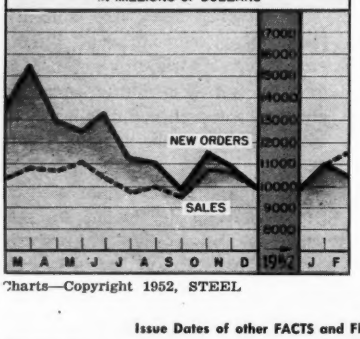
U. S. Bureau of Labor Statistics



Automatic Gas Water Heaters
Shipments in Units

	1952	1951	1950
Jan.	148,700	225,600	131,600
Feb.	146,100	213,400	156,500
Mar.	152,200	223,300	172,800
Apr.	.....	199,400	176,400
May	.....	167,400	195,200
June	.....	131,500	207,100
July	.....	102,400	197,500
Aug.	.....	124,400	259,800
Sept.	.....	130,900	222,600
Oct.	.....	148,800	235,100
Nov.	.....	143,400	206,000
Dec.	.....	127,200	202,500
Total	.....	1,931,200	2,363,100

Gas Appliance Mfrs. Assn.



Durable Goods Orders, Sales
In Millions of Dollars

	New Orders 1952	New Orders 1951	Sales* 1952	Sales* 1951
Jan.	11,068	15,050	10,970	10,430
Feb.	10,672	13,474	11,553	10,390
Mar.	.....	15,542	.....	10,851
Apr.	.....	12,987	.....	10,739
May	.....	12,404	.....	11,150
June	.....	13,303	.....	10,383
July	.....	11,274	.....	9,741
Aug.	.....	11,046	.....	10,052
Sept.	.....	9,880	.....	9,559
Oct.	.....	11,584	.....	10,700
Nov.	.....	11,090	.....	10,753
Dec.	.....	9,941	.....	9,854

*Seasonally adjusted. U. S. Office of Business Economics.

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Issue Dates of other FACTS and FIGURES Published by STEEL

Construction .....May 5	Gray Iron Castings..Apr.14	Ranges,Gas Apr.28
Employ., Metalwkg. Apr.21	Indus. Production ..Apr.21	Refrigerators Apr.28
Employ., Steel Apr.28	Ironers May12	Steel Castings Apr.14
Fab. Struc. Steel ...Apr.7	Machine Tools .....May 5	Steel Forgings Apr.7
Foundry Equip. Apr.14	Malleable Castings .Apr.14	Steel Shipments Apr.21
Freight Cars Apr.21	Pumps May12	Vacuum Cleaners ...May 5
Furnaces, Indus. ...Mar.31	Radio, TV May12	Wages, Metalwkg. ..May 5
Gear Sales Apr.7	Ranges, Elec. Apr.28	Washers May12

the lead, and there was a marked rise in the 0 to 30-day purchasing bracket. As to the amount of increase in material costs since Korea, 51 per cent of the members reported rises of 10 per cent, 44 per cent of the members said 25 per cent, while only 5 per cent of the purchasing agents reported jumps of more than 50 per cent.

Prices Sag . . .

Wholesale prices continued their downdrift in March to 112.3 per cent of the 1947-1949 average, reports the Bureau of Labor Statistics. That's 0.3 per cent below February prices and 4.2 per cent below the March, 1951, level.

While wholesale prices drifted downward in the past year, consumer prices showed a slow rise. The bureau's reading for March is 188.0 per cent (1935-1939=100), only a 0.1 per cent rise over the previous month but 3.5 per cent above the reading for the same month, last year.

Employment Up . . .

Employment made its spring pickup between March and April, with the usual increase in farm activity and other outdoor work. While agricultural employment climbed by 400,000, nonagricultural employment, at an estimated 53.7 million, remained about the same between the two months, says the Commerce Department. However, a sharp upturn occurred in the number of construction jobs, as many previously unemployed men were added. Aside from a slight drop in trade employment, there was little change in other nonagricultural industries.

Building Upward . . .

Construction is still remaining within its new high levels. In the week ended May 8, contract awards for heavy construction totaled $315 million. That's $26 million above awards reported for the previous week and 24 per cent above the average week to date, says *Engineering News Record.* Private housing led all other categories by totaling $76 million, 35 per cent above the average week to date. Awards for industrial construction totaled $47.2 million

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	83.0	53.0	104.0
Electric Power Distributed (million kwhr)	7,030	6,948	6,567
Bituminous Coal Output (daily av.—1000 tons)	1,425	1,622	1,615
Petroleum Production (daily av.—1000 bbl)	6,200[1]	6,297	6,162
Construction Volume (ENR—millions)	$315.1	$288.2	$294.8
Automobile, Truck Output (Ward's—units)	131,434	128,385	158,502
TRADE			
Freight Car Loadings (unit—1000 cars)	730	745	809
Business Failures (Dun & Bradstreet, number)	161	150	181
Currency in Circulation (millions)[3]	$28,523	$28,460	$27,255
Dept. Store Sales (changes from year ago)[3]	−2%	−1%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,262	$17,062	$14,718
Federal Gross Debt (billions)	$258.4	$258.3	$254.5
Bond Volume, NYSE (millions)	$13.7	$14.2	$14.9
Stocks Sales, NYSE (thousands of shares)	5,598	6,325	9,090
Loans and Investments (billions)[4]	$73.3	$73.1	$70.1
United States Gov't. Obligations Held (billions)[4]	$31.5	$31.2	$30.8
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92	171.92	171.92
STEEL's Nonferrous Metal Price Index[6]	240.9	240.9	242.3
All Commodities[7]	111.3	111.2	115.0
All Commodities Other Than Farm and Foods[7]	112.9	113.0	116.6

* Dates on request. [1] Preliminary. [2] Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3] Federal Reserve Board. [4] Member banks, Federal Reserve System. [5] 1935-1939 = 100. [6] 1936-1939 = 100. [7] Bureau of Labor Statistics Index, 1947-1949 = 100.

—the week's second highest category, but 15 per cent under industrial building in the average week to date.

Inventories Level Off . . .

Total business inventories at the start of April showed little change from the previous month, after allowance for seasonal variation. Book value of inventories was unchanged from the previous month, reports the Commerce Department, which says a decline of almost $150 million in retail inventories was offset by an increase in manufacturers' stocks. No substantial change was shown in wholesalers' inventories.

New Orders Drop . . .

Deliveries of new domestic freight cars in April amounted to 7403 units, the American Railway Car Institute and the Association of American Railroads announced jointly. While the backlog of cars on order and undelivered by May 1 totaled 108,270 units, orders for new freight cars totaled only 397 units.

Operating Income Up . . .

Net railway operating income—the amount left after payment of operating expenses and taxes but before interest, rentals and other fixed charges are paid — totaled $218.6 million in the first quarter compared with $178.6 million in the same period of 1951. So says the Association of American Railroads, which reports the March operating income totaled $76.6 million, compared with $80.3 million for the same month in 1951.

Income Unchanged . . .

Personal income in March, at an annual rate of $258 billion, was virtually unchanged for the third consecutive month, reports the Commerce Department. Industry payrolls, remaining at the February annual rate of $145 billion, showed slight gains in wage rates, but were offset by reductions in the amount of employment.

Trends Fore and Aft . . .

Gross national product in the first quarter was at an annual rate of $339 billion. That's $4.5 billion higher than in the fourth quarter, 1951. Bituminous coal output is about 5 per cent under last year. . . . Purchasing power of the dollar in April was 56.1 cents of the 1939 dollar. . . . Wholesale prices of all commodities rose 0.1 per cent to 111.3 (1947-1949=100).

The fact that *so many* manufacturers find there are Pheoll stock fasteners that meet exact needs — makes Pheoll stocks the *one source* for you to depend on, too. Our wide range of sizes, metals and finishes simplifies assembly problems; speeds production—because fasteners that fit, make jobs go faster!

Pheoll rolled threads and cold formed heads provide maximum structural strength to meet stress and strain. Snug thread mating surfaces assure greater contact with more lasting grip—adding life and service to your assembled products.

The extra fine head and thread finish of Pheoll quality fasteners improves the salability of your product. They help "dress up" the job! You can select from a wide variety of attractive head types in screws for metal, wood and plastics—nuts with single or double chamfer in various metals and finishes.

Write for Additional Information and Price List.

MAKE PHEOLL YOUR SOURCE FOR: Semst • Thread Cutting Screws† • Threaded Rods • Wood Screws† • Machine Bolts • Cap Screws • Stove Bolts† • Thumb Screws • Machine Screws†

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ZIP-ON SPEED NUT®

Tables 83%

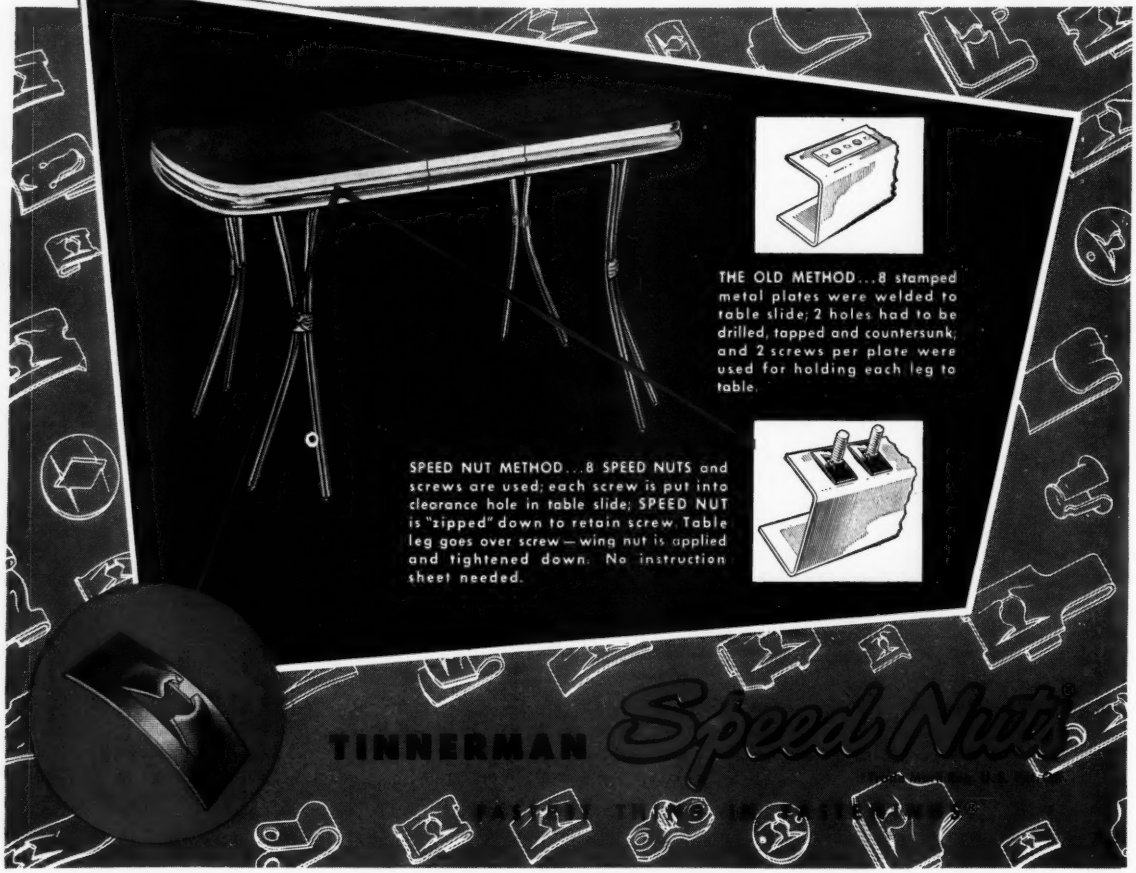
ASSEMBLY SAVINGS

Merit Table Co., Inc., changes to standard Zip-On SPEED NUTS for attaching table legs—improves product quality—saves 4 assembly steps!

Coming up with an 83% assembly savings—in the face of today's rising costs—is quite an accomplishment! How did Merit Table Company, Inc., of New York, N. Y., do it? Simply by trading in a complex production cycle for the streamlined SPEED NUT principle of spring tension fastening! It once required two presses, a tapper and a spot welder to attach fasteners for table legs. Now—standard Flat-Type Zip-On SPEED NUTS are quickly applied by hand—releasing this equipment for other production.

Added to this 83% savings is the greater customer satisfaction Merit has built into their product. Since the legs are assembled to the table by the customer, it's important that the job be made simple and easy. All the fumbling and working "blind" that was necessary in positioning screws and nuts to attach the table legs has been eliminated by quick-on, stay-on SPEED NUTS!

Perhaps there's a SPEED NUT "Savings Story" waiting to be found on your production line—better fastening engineering can pay you big dividends! Call in your Tinnerman representative for technical assistance. And write for your copy of Tinnerman "SAVINGS STORIES", a FREE booklet showing savings made in a wide variety of fastening problems in industry: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners, Ltd., Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S.A.—7 rue Henri Barbusse, Levallois (Seine), France.


THE OLD METHOD...8 stamped metal plates were welded to table slide; 2 holes had to be drilled, tapped and countersunk; and 2 screws per plate were used for holding each leg to table.
SPEED NUT METHOD...8 SPEED NUTS and screws are used; each screw is put into clearance hole in table slide; SPEED NUT is "zipped" down to retain screw. Table leg goes over screw—wing nut is applied and tightened down. No instruction sheet needed.
TINNERMAN
Speed Nut®

Men of Industry

FRED J. EBELING
. . . Dodge Mfg. gen. sales mgr.

W. H. LAGERSTROM
. . . gen. mgr. of Damascus Tube

E. OLNEY JONES
. . . senior V. P. at Federal-Mogul

Fred J. Ebeling was appointed to the newly created post of general sales manager, **Dodge Mfg. Corp.**, Mishawaka, Ind. He joined the company in 1943 and has been serving as assistant secretary and treasurer.

Walter M. Hanneman was appointed executive engineer, **Shakeproof Inc.**, division of Illinois Tool Works, Chicago. **William B. Denniston** was appointed manager of distributor sales. They will both be located at Elgin, Ill.

R. P. Brooks was elected vice president of sales for the Castleton Chrome Division, **Electroweld Steel Corp.**, Azusa, Calif.

A. Carl Weber, director of research and engineering sales, Laclede Steel Co., was elected president of **Steel Joist Institute**, Washington.

Herman Boley joined **Denison Engineering Co.**, Columbus, O., as assistant to the president. For the last few years he has served with ECA and MSA in London.

William J. DeLancey was named an assistant counsel of **Republic Steel Corp.**, Cleveland.

Clay P. Bedford was elected president and a director of **Chase Aircraft Co.**, West Trenton, N. J. He left his post as executive vice president of Kaiser-Frazer Corp. a year ago to serve in Washington as a production expediter, NPA.

Damascus Tube Co., Greenville, Pa., appointed **W. H. Lagerstrom** as general manager. He was formerly operating superintendent and construction engineer for National Tube Co.

James R. Weaver was appointed assistant to the vice president of manufacturing, **Westinghouse Electric Corp.**, Pittsburgh. He has been serving Baldwin-Lima-Hamilton Corp. for the last four years as vice president-manufacturing.

F. J. Perry was appointed supervisor of ore movement for U. S. Steel Co.'s **Oliver Iron Mining Division**, Duluth. He succeeds **Samuel Naismith**, transferred to the company's Pittsburgh staff.

Norman C. Owen was named general sales manager, **Webster-Chicago Corp.**, Chicago. He replaces **W. S. Hartford**, vice president-sales, who retired May 15.

Frank J. O'Brien Jr. was elected a vice president, **Metal & Thermit Corp.**, New York. **Charles R. Hervey** was made assistant controller. Mr. O'Brien has been manager, scrap department, since 1951.

W. S. Schamel, sales engineer, was advanced to assistant technical director in the dust and fume control division, **American Wheelabrator & Equipment Corp.**, Mishawaka, Ind. **G. W. Roper, J. K. Davidson** and **F. A. Lindahl** were named project engineers.

E. Olney Jones, vice president-secretary, was elected senior vice president and secretary of **Federal-Mogul Corp.**, Detroit, following retirement of **Stafford C. Reynolds**, senior vice president and treasurer, who continues as a director of the company. **Samuel E. MacArthur** was elected treasurer and continues as controller. **Gordon J. LeBrasse** was named acting director of research. **E. R. Darby**, vice president, research and development, has also retired.

T. V. Balch, vice president-sales manager, **E. F. Hauserman Co.**, Cleveland, was named vice president and director of contracts. **Richard M. Hauserman**, Chicago district manager, was appointed director of sales.

Gunnison Homes Inc., New Albany, Ind., subsidiary, U. S. Steel Co., elected **Henry W. Borntreager** as vice president and director of sales. He succeeds **William B. Eagles**, resigned.

Ray E. Winter was named safety director, **Inland Steel Products Co.**, Milwaukee. He formerly was safety engineer for General Electric Co.'s X-Ray Division.

W. D. Johnson was named western regional supervisor of the sale of welding positioners and industrial mixers for **Worthington Corp.** His headquarters are in San Francisco. **J. R. Hutchison** is regional manager for the Middle East, with

headquarters in Istanbul, Turkey.

Harold C. Reynolds, vice president of purchasing and production, **Universal Motor Co.,** Oshkosh, Wis., is planning semi-retirement after 23 years of service with the company. His duties have been assumed by **John Harden,** his assistant for some time.

Capewell Mfg. Co., Hartford, Conn., appointed **S. C. Gordon** domestic sales manager.

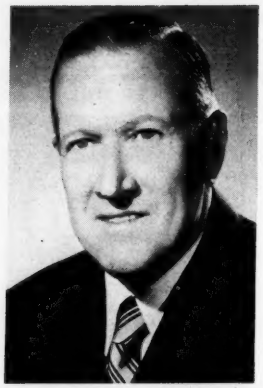
Frank M. Fitzgerald was appointed manager, production planning department, U. S. Steel Co.'s **National Tube Division,** Pittsburgh. He succeeds **James E. Smith,** retired.

D. M. Houghton, chairman of the board of **Atlas Tack Corp.,** Fairhaven, Mass., was also elected president to replace the late **Sherman H. Bowles.** Previous to association with Atlas, first as general manager and director, Mr. Houghton was for many years with United Shoe Machinery Corp. as manager of its Cross Tack-Making Division at East Jaffrey, N. H.

Robert Oehler was appointed Chicago district sales engineering manager, **Anker-Holth Division,** Wellman Engineering Co.

Richard A. Gehr was named sales manager of heaters and devices for **General Electric Co.'s** industrial heating department. Previously New York district heating specialist, he succeeds **Robert W. Kise** at Schenectady, N. Y., the latter having been recently appointed manager of product planning for the department.

WALLACE H. HITCHCOCK
. . . V. P. of Revere Copper & Brass



CHESTER M. McCREERY
. . . V. P. of Revere Copper & Brass

Revere Copper & Brass Inc., New York, elected **Wallace H. Hitchcock** and **Chester M. McCreery** as vice presidents. Mr. Hitchcock will be in charge of the Pacific Coast division at Los Angeles, where he has been general manager, and Mr. McCreery will be in charge of the Rome Mfg. Co. division at Rome, N. Y., of which he formerly was manager. **John C. Emison Jr.** was elected assistant treasurer.

Chris Ringhaver was appointed Chicago district sales manager, **Tinnerman Products Inc.,** and is succeeded as Rochester, N. Y., district sales manager by **T. M. Landfear. Herman H. Welland** succeeds **J. G. McLaughlin,** resigned, as district sales manager at Cincinnati.

Wallace L. Howe was appointed director of research and development at **Norton Co.,** Worcester, Mass., following resignation of **Dr. Samuel S. Kistler,** director of research. **David B. Tyler** was appointed to the staff of Norton Behr-Manning Overseas Inc., responsible for foreign advertising. He retains office in Worcester.

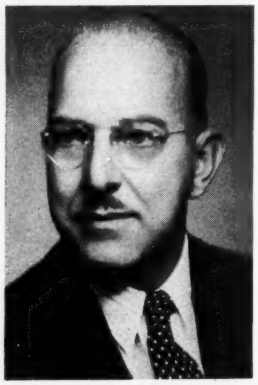
Edward O. Edney was appointed manger of order service, steam division, **Westinghouse Electric Corp.,** Pittsburgh. He succeeds William J. Kastor, retired.

Jack P. Williams was appointed midwest factory representative by **Centric Clutch Co.,** Woodbridge, N. J.

Paul F. Voight Jr. joined **Solar Aircraft Co.,** San Diego, Calif., to serve as consultant to the president on marketing methods and development of new products. In 1936 Mr. Voight organized the stainless steel division of what is now U. S. Steel Co., operating subsidiary of U. S. Steel Corp. He managed the division until retirement last February.

F. J. de Lorme was appointed secretary and assistant treasurer, **E. W. Bliss Co.,** Canton, O. He joined

RICHARD A. GEHR
. . . new position at GE



WALLACE L. HOWE
. . . heads Norton's research

F. J. de LORME
. . . Bliss Co. sec'y-asst. treasurer

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USUALLY COST LESS AT THE POINT OF ASSEMBLY

Body forging weighs 245 lbs.; length 47 inches. Unusual stock displacement is typical of T & W forging technique.

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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

JAMES M. ROBERTSON
. . . chief chemist at Wellman Bronze

A. S. AULT
. . . Chicago Vitreous V. P.-sales

GEORGE W. EDWARDS
. . . service mgr. of Basic's div.

Bliss in 1950 as division controller, New York.

James M. Robertson, associated with **Wellman Bronze & Aluminum Co.,** Cleveland, for the last decade, was appointed chief chemist in charge of quality control at all plants. **Robert C. Boehm** was appointed chief metallurgist, and **Robert W. Spacek** as assistant production manager.

Morgan Engineering Co., Alliance, O., appointed **R. D. Crane** materials control superintendent in charge of purchasing, receiving and stores. **Theodore T. Buchanan** retires as purchasing agent.

J. M. Purdum was appointed advertising manager at **Perfection Stove Co.,** Cleveland.

Edwin E. Davis was appointed order division manager, **Jones & Laughlin Steel Corp.,** Pittsburgh. He succeeds **W. H. Lewis,** appointed director of organization planning.

A. S. Ault was elected vice president, sales, **Chicago Vitreous Enamel Product Co.,** Cicero, Ill. He has been manager of sales and service since 1948.

Stanley M. Hunter resigned from **American Hoist & Derrick Co.,** St. Paul. He joined that company in 1936 and since 1949 has been executive vice president.

F. P. Diener was appointed director of tests and research, **Universal Atlas Cement Co.,** New York, subsidiary, U. S. Steel Co. He succeeds the late **George L. Lindsay.**

In the Buffalo motor and control division of **Westinghouse Electric Corp., Frank P. Taugher** was appointed to the newly created position of assistant to the vice president. He is succeeded as manager, industrial control engineering department, by **D. L. Pierce,** former manager of the general purpose division of that department.

Basic Refractories Inc., Cleveland, named **George W. Edwards** service manager of its special service division, organized last year to assist steel producers with construction of Ramset bottoms in open-hearth and electric furnaces.

Horace S. Johnston was elected treasurer of **United States Radiator Corp.,** Detroit.

W. C. Snyder Jr., president and chief executive officer, **Blaw-Knox Co.,** Pittsburgh, was elected to the additional post of chairman of the board. **James H. Elkus** was named assistant manager, Blaw-Knox division, responsible, under the division manager, for all departments of this fabricating unit at Blawnox, Pa., including sales and engineering. **W. J. Kalmeyer** was appointed works manager of the division.

Hewitt M. McIntosh was named midwest district manager, Votator Division, **Girdler Corp.,** Louisville.

OBITUARIES...

E. J. Kulas, 72, president of **Midland Steel Products Co.,** Cleveland, died May 13. He was president of Otis Steel Co. from 1925 until its merger into Jones & Laughlin Steel Corp. in 1942. He served as director and vice chairman of J&L's executive committee from 1942 through 1946.

Ray D. Titus, 67, for 22 years chief clerk in the sales department, bolt and nut division, **Republic Steel Corp.,** Cleveland, died May 7.

Benjamin C. Sawyer, director of purchases and procurement, **Bethlehem Fabricators Inc.,** Bethlehem, Pa., died Apr. 25.

Dr. George B. Waterhouse, 69, an industrial consultant on metals, and professor emeritus of metallurgy at **Massachusetts Institute of Technology,** Cambridge, Mass., died May 10.

Max F. Reinhold, 50, president and founder, **American Welding & Engineering Corp.,** Milwaukee, died of a heart attack May 10.

Miss Marion M. Roof, 55, former production manager, malleable plant, **American Radiator Co.,** Buffalo, died May 9.

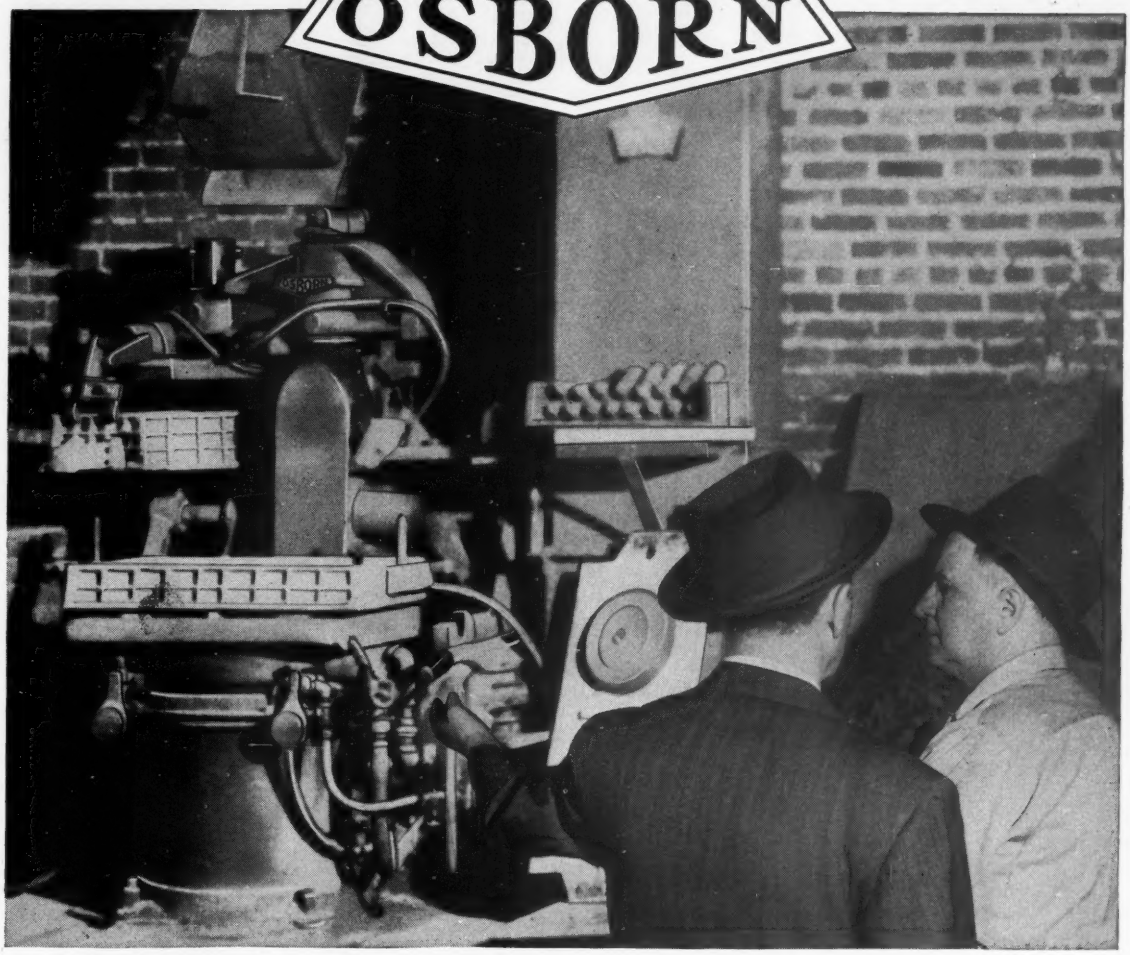
Fred A. Goebler, 56, plant engineer, **DeLaval Separator Co.,** at Poughkeepsie, N. Y., died May 8.

Frederick Koch, 61, vice president of **United States Tool Co.,** East Orange, N. J., died May 7.

J. H. Praigg, 34, vice president-general manager, **M-B Machine Products Co.,** Burbank, Calif., died May 3 of a heart attack.

Edward E. Steinhorst, 56, vice president, **Emil Steinhorst & Sons Inc.,** Utica, N. Y., died May 4.

OSBORN



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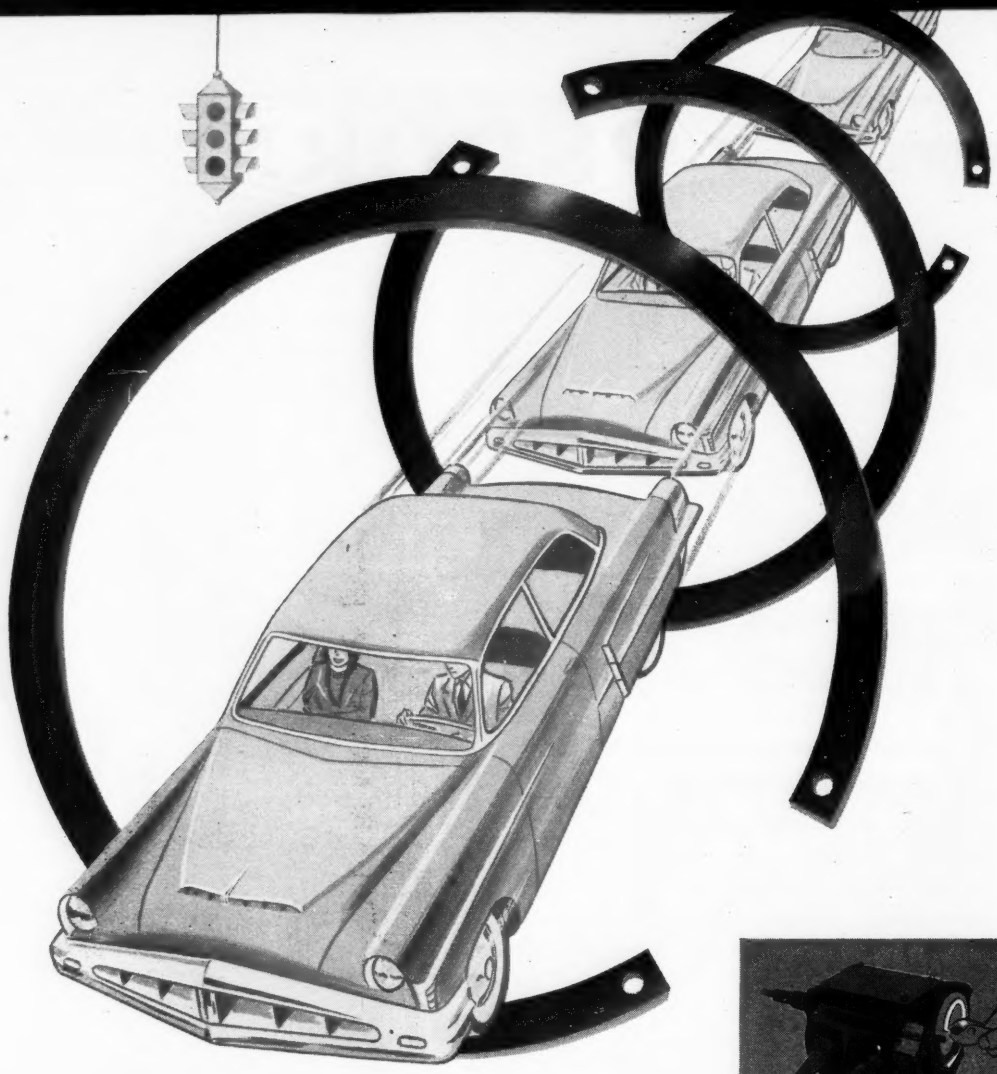
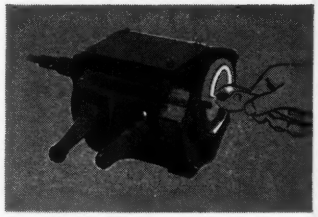
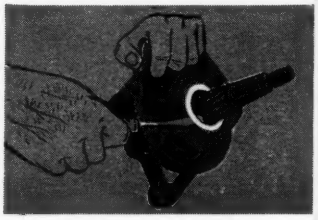


RELIANCE SNAP RINGS REDUCE COST of Assembling Overdrive

Overdrive in millions of American cars brings greater convenience and operating economies to the motoring public. Through the use of Reliance Snap Rings in these overdrive assemblies manufacturers enjoy greater production efficiencies and lower costs. Throughout industry, Reliance Snap Rings have cut assembly time – eliminated machining operations and reduced final unit costs. You can profit through such economies in your own production – now. Reliance Snap Ring engineers will welcome an opportunity to review your assembly parts or drawings for snap ring application recommendations. For complete information write, wire or call your nearest Reliance sales office today.



Reliance snap rings lock retainer plate, gear control plate, blocker assembly, and pawl accurately into overdrive unit.



Rear main bearing locked into position by Reliance snap rings in overdrive unit.

EATON

Reliance Rings

MANUFACTURING COMPANY, RELIANCE DIVISION

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Production AND Engineering NEWS AT A GLANCE

NEEDED: MORE HORSEPOWER—The engineer's job of the future is making more efficient the conversion of energy into horsepower hours, says Charles L. McCuen, General Motors' vice president and general manager. Speaking at Michigan State College Engineering Exposition, he stated that we have almost 10 horsepower working for each of us around the clock every day and, when this is compared with an average man's output of one-tenth horsepower, we find that engineering developments increased man's output at least 100 times. He pointed out engineers should seek new processes to get materials now locked up in the earth's crust, the atmosphere and seven seas. Another challenge is utilization of solar energy. Solar energy, falling upon one square mile of the earth's surface per day, he indicated, is equivalent to 400,000 gallons of oil or 2000 tons of coal.

HOW'S YOUR INSPECTION?—If you are working on a government contract, and you are stumped by the stiff specifications, chances are your quality control system may need a little face lifting here and there. Perhaps the method used by Pantex Mfg. Co. may give you some ideas on how to solve your problem. It involves the use of average and range charts which supply management with a record of any machine's ability qualitywise. They offer a graph of the trend of the machine and operator toward better quality or their tendency away from desirable quality levels. p. 90

PROVIDES TRIPLE ADVANTAGES—Newest bearing for use on high speed shafts reported by Roller Bearing Co. of America, Trenton, N. J., is so new that the Anti-Friction Bearing Manufacturers' Association has not yet arrived at a standard description for it. It isn't a needle bearing, journal bearing or a cylindrical roller bearing, but does combine best features of all three. The pitch line bearing, as it is called, has the same dimensional advantages as precision needle bearings. It provides the flexibility of mounting and easy maintenance of journal roller barings, and roller alignment formerly found only in precision cylindrical roller bearings. Perfect roller alignment is maintained by cage contact at the pitch line enabling the bearing to be mounted in any plane.

COKE FROM STILLS—We have bee-hive coke and by-product coke and now—distilled coke. The product which is made by surrounding the processing oven with the material instead of putting the material in the oven, contains about 10 to 12 per cent by weight of combustible, volatile matter. Having quicker ignitability, the fuel is adaptable for industrial furnaces, being smokeless, it might solve your smoke problem. Besides processing or distilling a charge of coal into coke in about 3 hours, Stilcok Co. of Pasadena, Calif. says, the method may play a leading role in salvaging oil. It prevents heat cracking of oil vapors from the coal, recovering the oils in their true petroleum-like form.

STEEL STRIP TO SPECS—By adding a reversing cold strip mill as part of its facilities, a steel warehouse meets problems of special requirements by rolling strip to customer specifications. Now, it's no problem for the firm to supply small lots of cold rolled strip steel in varied width, gage, temper and finish. p. 100

CLOSE HEATING THE ANSWER—If a forming die wears out, it's too soft. If it breaks, it's too hard so—what's the answer? According to Dr. S. G. Graham, chief metallurgist of Latrobe Electric Steel, the answer is precise heat treatment. He says to attain the desired degree of hardness in metal forming dies, extremely close control of temperature during heat treatment is necessary. Die wear is affected by the amount of carbon in the surface. The remedy is controlling this factor by methods that prevent loss of carbon from the die surface during heat treatment.

ZINC DUST SETUP PAYS OFF—Efficient zinc dust recovery setup at Spang-Chalfant's pipe galvanizing shop not only increased recovery rate by 50 per cent, but also saved the company an additional $6000 per month in the first six months of operation. Savings came from bigger sales of dust, on labor and maintenance. As a conservation factor, the system increased the supply of zinc dust and zinc cake to smelters during its first six months of operation by nearly 250 tons. p. 93

"HOT" GEARS TEST OIL—Radioactive gears not only are simplifying and speeding up lubricating oil research, but also are providing researchers with more foolproof information. At the Emeryville, Calif., research laboratories of Shell Development Co., which tests wear of machinery gears under various lubrication conditions, the new testing technique works something like this: Shell scientists send their gears to Oak Ridge, Tenn., where they are bombarded with neutrons. Oak Ridge then shoots the "hot" gears back to Emeryville. A "hot" gear then is meshed with an ordinary gear and run on a wear test machine. As microscopic particles of radioactive metal are worn away, they are measured by Geiger counters on the oil stream. Then later ordinary photographic film is placed next to the ordinary gear. If "hot" particles were transferred to the cold gear's metal, the fact shows up on the film.

Metalworking Outlook—p. 53 *Market Outlook—p. 165*

QUALITY CONTROL—*You'll Need A System*

Stumped by stiff government specs in your contract? There's a right and a wrong way to set up the quality control system. Here's one way to do it—and it works

By C. W. KENNEDY
Federal Products Corp.
Providence, R. I.

PLANTS working on government contracts usually run smack up against a request amounting to a demand for a quality control program. With vague ideas on how his product will be sampled and inspected, the supplier seldom realizes the full impact of military sampling. When the first few lots are presented to the military district inspector, comes the dawn, and a scramble to get something definite, particular and effective going in the line of quality control, including applicable statistical techniques.

Here's how one firm solved this problem. Pantex Mfg. Co., Pawtucket, R. I., supplies machine gun bullet components of fairly large caliber to certain arsenals, loading plants and prime cartridge contractors. This part of its military manufacture rates as mass production, with operations running around the clock six days a week on virtually one item. In another division of their plant hydraulic valves of several designs are made to supply to aircraft companies under Air Force quality supervision. The latter type of manufacture falls more in the category of job shop work.

Solution in System—Quality control, particularly the statistical application, fitted both branches with nearly equal facility. Ordnance and Air Force inspectors reject less than 1 per cent of the lots and orders steadily submitted for approval. The practical methods used in production deserve a great deal of the credit for this existing record.

Operations on the bullet, as well as on many parts for the hydraulic valves, start from bar stock fed into automatics. Rigid controls were imposed on the quality of parts coming from these machines.

Each part has one or two dimensions which must be held to close tolerances, or which, because of the peculiarities of machining, are difficult to hold under control. On the bullet there is the diameter of the base—the part crimped into the shell—and the concentricity of the cavity bore with the outside diameter of the body.

Tell-Tale Charts—Average and range charts were the statistical techniques adopted here. Charts are hung by clipboard on the end of each machine. A pair of charts is maintained for each machine per shift, one showing the control of the base diameter and the other reporting constantly and accurately the concentricity between cavity and bore. Horizontal dotted lines are pre-established standard value lines which are put on the charts before they are hung on the machines.

A patrol inspector visits each machine about three times an hour and reads the relevant dimension with a suitable indicating gage on the last three consecutive pieces made. These dimensions are registered on the chart, the average is calculated and the range and their values are plotted on the chart.

Warning Is Sounded — If the chart shows the work out of control, the inspector interrupts the patrol routine for a few minutes to segregate the batch of work completed since the last round and gages it 100 per cent. He immediately culls out the oversize and undersize rejectable pieces. In the meantime the operator shuts down the machine and makes the necessary adjustments to correct the difficulty. When the operator sees the size trends of his work which the sloping lines on the chart illustrate, he notices that the averages and ranges are approaching their respective control lines in each case. Thus warned, he makes the required corrections *before* the work has a chance to go out of control and out of tolerance.

The other hard-to-machine-in-control element of the bullet is the important ballistic characteristic of its concentricity with the outside diameter of the body.

DATE 4-3	MACHINE NO. 4			PART NO. 761E4	ORDER NO. 1st Shift
TIME	SS	D MAJOR	D MINOR	REPORT	
7:40	10	0	0	(A)	
8:10	10	1	0	Low base	
8:45	10	0	0		
9:20	10	0	2	high body	
9:55	10	0	2	high body	
10:30	10	3	1	Eccentricity	(Sorted)
11:00	10	0	0	(B)	
11:40	10	1	0	Crimp groove high	
12:50	10	1	0	Crimp groove high	(Sorted)
1:30	10	0	0	(C)	
TOTALS	100	6	5	PER CENT DEFECTIVE 6% MAJORS PER CENT DEFECTIVE 5% MINORS	

Inspector's report shows time the inspection took place, number of pieces that were checked and the number of defectives found. Reasons for rejection of pieces are an aid to the foreman and operator in correcting cause

STATISTICAL METHOD

Chart control lines are based on R' obtained from the formula $R' = Td_2/6$, where T is the tolerance spread or total tolerance and d_2 for a sample size of three is 1.693. R' is then multiplied by the constant, A_2, and the result is the distance from the upper and lower tolerances at which the control lines are added to the averages section of the chart.

Lower limit for the range control is, of course, zero. The upper limit is D_4R' distance from the lower limit, where D_4 is a constant.

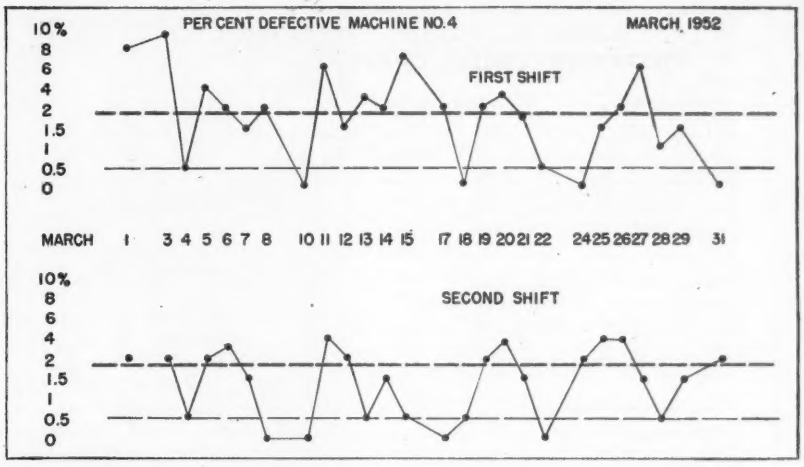
No Lower Limit—Allowed tolerance for eccentricity is 0.008-inch total indicator reading. Here there is no lower control limit. Since, in connection with eccentricity, there is no lower tolerance limit, no undersize (zero eccentricity or perfect concentricity being the ideal), the lower the average or range figure from each sample, the better. Hence, no lower control limit.

While the base diameter and cavity location top the list in importance, the blueprint of the projectile shows a dozen or so more dimensions, tolerances and conditions to be met. To apply an average and range chart to each one of these would be possible but impractical, expensive and unnecessary. The trick is to use one or two average and range charts to control the hard-to-hold and important tolerances.

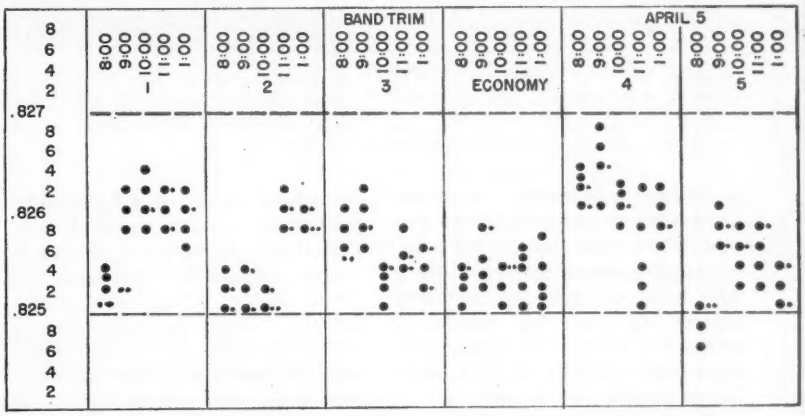
Total Is Ten—After examination of the three-piece sample and plotting the results on the two charts, the inspector adds a random sample of seven more pieces from the work completed since the last inspection round. All ten pieces are then gaged, measured and examined for all characteristics, and the results of the inspection are written down on a report form.

Inspector marks down the time the sample was taken, sample size (ten pieces), number of rejects and the reasons for rejection. At the end of the shift, the inspector adds up the pieces he has examined plus all the rejects. Dividing the total number of rejects by the total sampled gives the per cent defective for the day's work. Per cent defective is listed in major and minor columns according to military classification of defects.

Figuring the per cent of out-of-tolerance work the machine produced in a shift has a statistical purpose in that the daily per cent defective for each machine is plotted on a chart. Such charts, one for each shift on each machine, present a month's quality report for that shift's work on that machine.



Graph compiles quality tendencies of one machine and operator for a month's production. Called P charts, these allow quick comparisons between the machines and operators on a shift and comparison of one shift with another

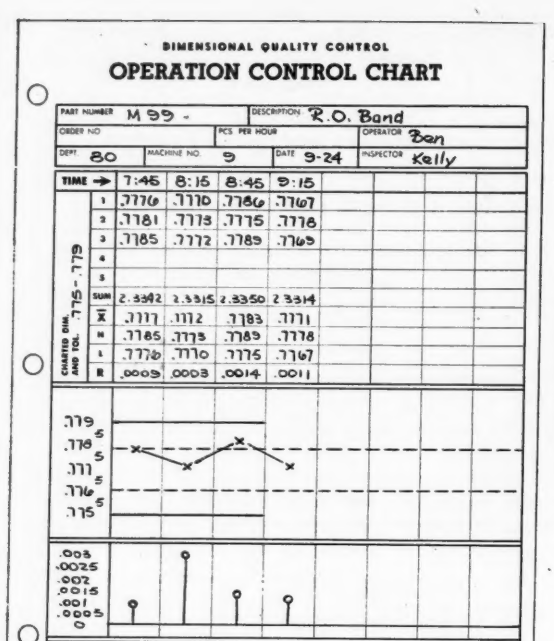


Dot chart is nonstatistical but graphic method of controlling quality. Five dots per vertical row represent gaged dimension of five samples pieces.

"P" Like in Profit—These so-called P charts supply management with a record of any machine's ability qualitywise. They offer a graph of the trend of the machine and operator toward better quality or their tendency away from desirable quality levels. An erratic saw tooth chart also points either to a poor machine, poor tooling or an unstable operator. The charts allow quick comparisons between machines and operators on the same shift, between shifts and the quality pictures of one month compared to another month. Chart shows a desired average line whose purpose is to cover the error in sampling.

While the inspection report shows that the inspector looked at a hundred or so pieces during the day, the machine itself produced around 3000 pieces. No sample necessarily reflects exactly the true condition of the lot it represents. There is always a considered risk in sampling. The per cent defective appearing on the chart may differ from the desired ½-per cent. Chances are, however, that the day's work itself contains just about ½-per cent out of tolerance pieces *provided* the per cent defective charted is inside the 2 per cent control limit.

Even though the sampling shows no defective work all day there is



DIMENSIONAL QUALITY CONTROL

OPERATION CONTROL CHART

PART NUMBER	M 99 -		DESCRIPTION	R.O. Band	
ORDER NO		PCS PER HOUR		OPERATOR	Ben
DEPT. 80	MACHINE NO. 9		DATE 9-24	INSPECTOR	Kelly

TIME →		7:45	8:15	8:45	9:15
CHARTED DIM. AND TOL. .775 - .779	1	.7776	.7770	.7786	.7767
	2	.7781	.7773	.7775	.7776
	3	.7785	.7772	.7789	.7769
	4				
	5				
	SUM	2.3342	2.3315	2.3350	2.3314
	$\bar{X}$	.7777	.7772	.7783	.7771
	H	.7785	.7773	.7789	.7778
	L	.7776	.7770	.7775	.7767
	R	.0009	.0003	.0014	.0011

.779
.778
.777
.776
.775

.003
.0025
.002
.0015
.001
.0005
0

OTHER DIMENSIONS AND REMARKS

Average and range chart shows quality trends of operator and machine during shift. Dotted lines are pre-established control lines. Solid lines are the total tolerance spread of operation

a strong probability of some amount up to one-half of one per cent substandard units being present nevertheless in the day's batch. And when the per cent defective exceeds the 2 per cent control, it means the day's work surely contains some amount greater than the prescribed ½-per cent.

Question and Answer—The question naturally comes up now: If the government demands your material at 0.65 per cent level, how can you get it by the resident inspector's sampling when it possibly contains 4 and even 7 per cent defective work?

First, remember the chart shows the per cent defective *manufactured* by the machine that day as reported by the sampling. It can be calculated statistically, and proved by 100 per cent sorting out of a day's work, that if only one defective is found in the occasional patrol sample of ten, the ½-per cent quality level is not being exceeded. But where two or more defectives appear in the sample, the bell rings and the red light flashes, figuratively speaking.

For example, as shown in the illustration, at A in the second inspection round, the operator was warned of trouble. He evidently did something about it because the next three rounds reported zero defectives. However, at the sixth round, location B, the inspector found three defectives in the sample. Here the machine was shut down again and the tool setter went to work. Also the inspector segregated the hundred or so pieces done since the last round and gaged them all.

Bell Ringer — Again at C the sorting operation was repeated, although only one "d" was counted in the sample, because one defective had also been found in the sample in the previous round. In other words the consistent finding of substandard work in successive rounds also rings the bell to shut down, segregate and sort back.

Thus it is that while the chart may show too high a percentage of out-of-tolerance work to pass government sampling, the on-the-spot sorting signaled by the 10-10-10 report cleaned out the defectives before the contaminated batches joined the day's total work.

In one area—that of trimming the rifling bands to diameter—the nonstatistical but graphic quality control technique called a dot chart is used. Five pieces taken from a band trimmer at each round are gaged and the exact diameter plotted on a chart in a vertical row of dots. One inspection round at the band trimmers covers several machines. Furthermore the work from all of them is mixed together in a common batch. It is necessary to analyze not only the control for high and low bands on any one machine but also to see what the hour-by-hour results of the group are.

Point of Emphasis — Working with the military the situation usually comes to the point where emphasis is placed on the general quality level of the entire plant in addition to accepting the product by lot sampling. Practically, so far as the government is concerned, a satisfactory steady quality level means what they call reduced sampling.

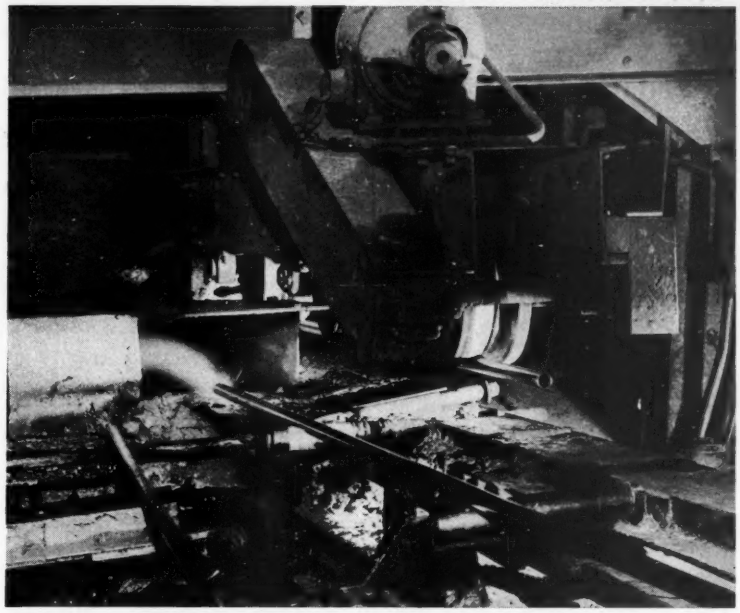
For this purpose a roving inspector moves steadily from station to station. A random sample of ten pieces is taken from normal production at each station where it is gaged and examined for quality deviations acquired in manufacturing up to that point.

The form reports the number of defectives counted in any sample of ten taken at any of the prescribed stations.

1200 Per Shift—At the end of the shift a 50-piece sample of the work in each part of the shop has been inspected. Since there are 24 stations, the inspector looks at 240 pieces throughout the shop in one round, and has inspected a maximum of 1200 pieces by shift's end.

Total defectives are added up at the end of the day and their numbed divided by 1200 to get a plant-wide per cent defective or quality level. These daily per cents are plotted on a P chart which, kept week in and week out, offers evidence of continuing plant quality, or the lack of it.

Roving inspection has plenty of value over and above supplying a basic plant quality level figure. From it plant supervision can promptly spot the quality weak areas and go to work on them. Since the stations include some points where samples are taken beyond the normal inspection in that area, the report also provides a check on the effectiveness of the local inspection.



After steam blowing, galvanized pipe lengths roll onto a conveyor (left). On the right a hot-dipped galvanized pipe is being withdrawn from the kettle through a compressed air wiping ring by motor-driven magnetic rolls

Zinc Dust Recovery—

Collecting System Saves $6000 per Month

Efficient recovery setup at Spang-Chalfant's pipe galvanizing shop paid for itself in less than a year. Savings are on bigger sales of dust and on labor and maintenance

FIFTY-PER CENT increase in zinc dust recovery in pipe galvanizing operations at the Etna, Pa., plant of Spang-Chalfant, division of National Supply Co., saved the company an additional $6000 per month in the first six months of operation in 1951. This includes increased sales of dust and savings on labor and maintenance. Total cost of the new recovery equipment was amortized in less than a year. The improvement in working conditions in the galvanizing department was another important advantage of the high efficiency of the equipment.

As a conservation factor the equipment increased the supply of zinc dust and zinc cake to smelters during its first six months of operation by nearly 250 tons. This would yield close to 200 tons of zinc.

Features of the zinc recovery equipment are (1) its large size, (2) the completely mechanical handling of the dust from the pipe blowing operation to box car for shipment, and (3) use of recirculated water in recovering as cake the dust that escapes the cyclone collectors.

Twin Collectors—Collecting system receives zinc dust from two dust boxes near two galvanizing kettles. Dust is produced by blowing galvanized pipe with steam at 150 pounds pressure to make a smooth coating. It is gathered into the dust boxes by suction of two 12,000-cfm exhaust blowers through two 20-inch OD pipes below the floor and blown into two 20-inch diameter standpipes.

Heavier particles are separated at the top of the standpipes by twin cyclone collectors approximately 55 feet above ground. The dust-laden air enters the collectors at the top and flows down the sides until reversed by a vortex plate. The air then flows up through the center of the cyclone collectors. Heavier dust particles drop into a hopper before this reversal. The hopper is 20 feet square and holds 84 tons of zinc dust. About 70 per cent of this dust will pass through a 200-mesh screen. Bottom of the hopper, once used for coal, slopes at 45 degrees to a center discharge opening which is provided with a horizontal sliding gate.

Wind, Dust and Water—Dust that is too fine to settle in two cyclone collectors is carried down from the top of the collectors through a 36-inch duct and is blown by a 24,000 cfm blower at 4000 fpm into the bottom of a Ducon washer. This washer is a vertically mounted tank 7 feet in diameter and 18 feet high, topped by a 16-foot stack. Centrifugal motion is induced by the air flow entering tangentially and the air mixes with descending water which removes some of the heavier particles.

Air continues to flow upward through a set of vanes which step up velocity and centrifugal force. Dust particles are hurled into a sheet of water that descends along the inner wall of the washer. The air is then accelerated further by another set of vanes and more dust is removed in the same way.

Particles of water are entrained with the air during this operation and the mixture of air and water passes through a third set of vanes which is above the point of water injection. After this final accelera-

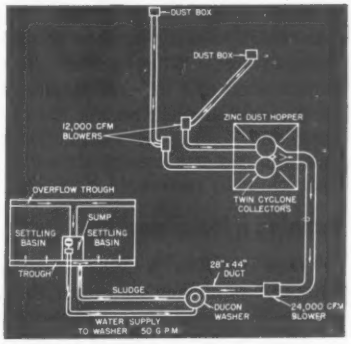
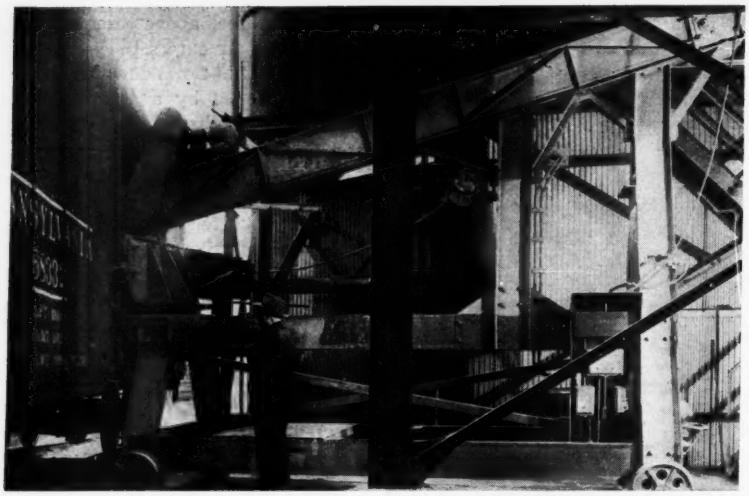


Diagram of zinc dust collecting system



Mobile two-step belt conveyor delivers zinc dust from hopper to all parts of a box car. Delivery belt can be swung 180 degrees by chain sprockets and extended by rack and pinion from 8 to 16 feet from its center line

tion entrained water and zinc dust are expelled and the air flows along the inner wall and passes up through the stack.

Water Recirculated—Water with entrained zinc dust drains out the bottom of the washer by gravity to an open trough beside two settling basins into which it empties. These two basins, each of which is 15½ x 17½ feet in area, are used alternately. A motor-driven, 50-gpm pump picks up the overflow from the basins in a sump and recirculates the water through the Ducon washer for further removal of dust. This recirculation of water is one of the unusual features of the system. Make-up water is admitted to the sump by means of a float valve which maintains a constant water level.

When the level of settled zinc sludge nears the top of one basin, the flow is directed into the other basin. Zinc sludge in the first basin dries out and solidifies into zinc cake which is easily broken up and shoveled out. When enough has accumulated and dried it is picked up by a clamshell bucket in the yard and loaded in railroad car for shipment.

Running a Metalworking Shaper

"How to Run a Metalworking Shaper," published by South Bend Lathe Works, is a manual for the company's 7-inch shaper. Covering setup and operation, the 32-page handbook contains more than 65 photographs, diagrams and exploded views to show internal parts, how to grind differently-formed tool bits for shaper cuts and how to handle the many job setups used in shaper work. Copies sell for 25 cents and may be obtained from distributors or by writing directly to the company, South Bend 22, Ind.

Method Recovers Lithium

Lithium sulphate can be extracted from two of its four sources simultaneously

LITHIUM sulphate is extracted from two of its four major sources simultaneously, in a process developed by the Bureau of Mines.

Study and development of the method were done at the bureau's Region V, Rapid City, S. Dak., field station by S. M. Runke, metallurgist-in-charge, and L. H. Kalenowski, former bureau chemical engineer.

Lithium, its alloys and salts, have become increasingly important as industrial materials. The silvery-white metal, the weight of which by volume is only about 60 per cent that of water, now has a wide variety of uses, ranging from purifying helium gas by removing the nitrogen to scavenging molten metals of undesirable impurities, as well as in welding aluminum.

The Big-4—Lithium is found in many mineral compositions. However, only four have commercial importance. These are amblygonite, lepidolite, zinnwaldite and spodumene, the latter being the most important source. Since amblygonite and spodumene frequently are found in the same ore, a single process for treating a mixture of them would make possible more use of amblygonite as a source of lithium and obviate separating the two minerals when they occur together.

Recoveries ranging from 66.7 per cent to 97.3 per cent of the lithium in the ore mixtures are reported. A single set of conditions was determined under which good recoveries of lithium could be obtained from either of the two minerals and mixtures of them.

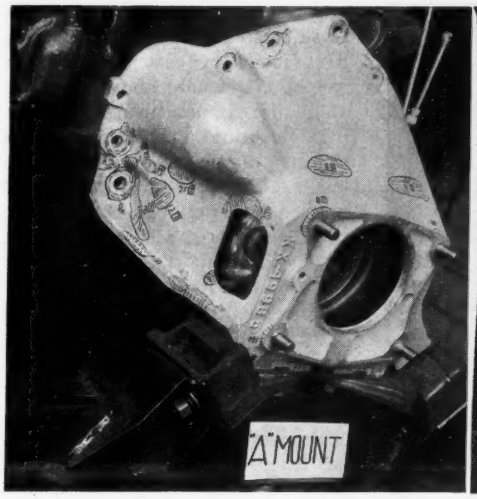
Lithium producers are the Metalloy Corp., a subsidiary of Lithium Corp. of America, Minneapolis, and the Maywood Chemical Works, Maywood, N. J. The metal is used in the production of high-conductivity copper and copper-base alloys, and as a starting point in the preparation of certain lithium compounds.

New Lab for Westinghouse

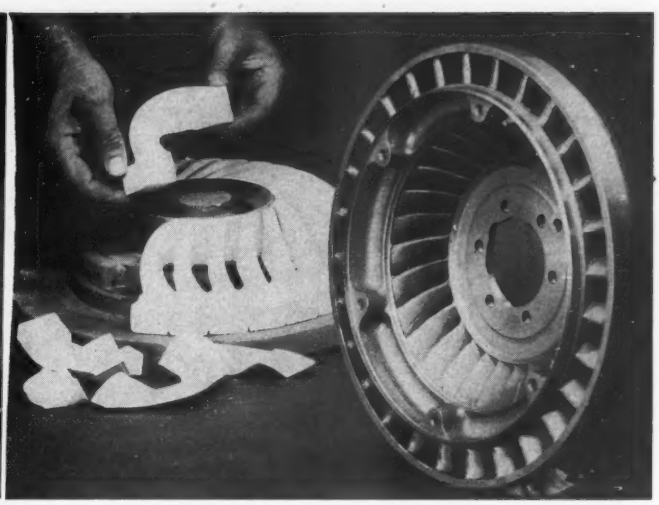
Westinghouse Electric Corp. is expanding laboratory facilities at the S. Philadelphia Works. D. W. R. Morgan, vice president, says construction on a four-story steam and gas turbine development center will begin this summer and the lab should be functioning in its initial job of Air Force research within a year.

Main test hall will accommodate steam and gas turbines and their components up to 15,000-kw capacity. Three 8000-hp axial-flow compressors will provide facilities for gas turbine compressor development and the Air Force wind tunnel. Laboratory units are planned to house activities in hydraulics, heat exchange, mechanics, aerodynamics, combustion and a model shop.

Powerhouse boiler will provide 150,000 pounds of steam per hour at 900°F. A reheater in the laboratory, used in conjunction with reducing valves, will make available steam at any desired pressure up to 1500 psi and at temperatures ranging from 800 to 1100°F.



Measuring clutch housing strains by use of Stresscoat, strain-indicating lacquer. Typical patterns are shown



Plaster process permits casting complicated parts having good surface finish and close dimensional tolerances

ALUMINUM ALLOYS:

Automakers May Use More

Sphere of influence for aluminum is extended as new alloys, new developments point the way to an ever-increasing number of applications in the automotive industry

ALUMINUM industry is on the lookout for specialized applications where aluminum can compete on a cost basis, or where a combination of some of the valuable alloy properties of aluminum can improve performance or appearance, particularly if there is little increase in cost or where availability or price of other materials dictates a change.

Brazed Aluminum Castings — Castings which require the use of intricate cores in any metal are necessarily high in price. A typical example is a cylinder head for an overhead valve engine. Not only are cores in themselves expensive but core shifts or broken cores lead to indefinite or plugged water passages; core sand is not always easy to remove; and core wires are sometimes left within the casting. A method to eliminate cores would have obvious advantages. The present concept is to divide the castings into simple, easy-to-make, high-production sections which can then be assembled into the finished part by means of brazing.

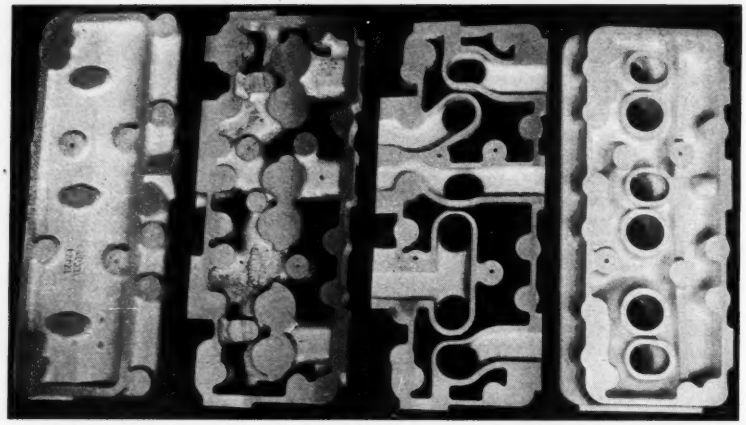
Success of the assembly of aluminum castings by brazing is dependent upon the availability of a suitable alloy for the castings—one that will lend itself to brazing and will also have the necessary qualifications for cylinder heads such as strength, resistance to corrosion, good machinability, satisfactory foundry characteristics and low cost. Brazing procedure dictates an alloy with a high melting range, one above the melting range of the brazing filler material used in the joint.

Brazing of aluminum alloys is not a new technique, since it has been used commercially for many years and has reached a high stage of development. Process involves supplying filler material to a joint in the presence of a flux and heat. This filler material may be supplied as a separate piece, in the form of wire or sheet shims, or it may be supplied as an Alclad coating on sheet material. Heat is applied by torch, furnace, or in a molten flux bath (dip-brazing). Application of brazing to cast assemblies, is relatively new, having awaited development of a casting alloy with properties suited to the process.

Prior to brazing the aluminum castings must have a satisfactory flatness and surface treatment. Permanent mold castings have good commercial flatness. In as-cast condition, C612 alloy has excellent elongation. Simple flattening operations can be easily accomplished. A coining operation or a quick touch to a disk or belt sander should be sufficient. Smooth, machined surfaces are not necessary. Standard aluminum chemical cleaning practice utilizing a hot 5 per cent sodium hydroxide etch followed by a cold water rinse, a 58 per cent concentration nitric acid dip and a final hot water rinse is used to clean parts before brazing.

Clearance Between — Successful

By J. H. DUNN & E. P. WHITE
Development Division
Aluminum Co. of America
Pittsburgh



Sections made easily on high production, permanent mold equipment will be brazed to make complete cylinder head that formerly was expensive, solid casting

brazing requires a definite clearance between parts to be joined. One means of doing this, and that used in the cylinder head assembly, is the use of small washers of 2S alloy 0.010-inch thick between the layers of castings. Melting point of 2S is higher than that of the brazing material, thereby establishing a joint clearance and preventing the squeezing out of the brazing material. Knurling or corrugating the surface, mixing small aluminum shot with the flux, have also proved satisfactory for establishing the necessary clearance.

Assembly is now ready to be passed into a furnace. Continuous furnaces are used in the brazing of aluminum assemblies. They consist of a preheating chamber, followed by an electrically heated chamber with close controls. Parts are brought to a temperature of 1085° F, plus or minus 5 degrees. It is important that temperature be brought up gradually and evenly to assure complete brazing of all areas.

After brazing, assembly cools to approximately 900° F, assuring solidification of all brazing material. Then it is quenched in water, held at about 180° F. Final cleaning occurs in a solution of nitric acid of 58 per cent concentration at room temperature, followed by hot water rinse.

Iron to Aluminum—An experiment in brazing iron to aluminum was accomplished in installation of valve seats in a cylinder head. Figure-eight type of seat was selected because it would permit the use of larger valves and would eliminate the necessity of an aluminum wall between the valves if individual seats were employed. Iron part was plated and filler material supplied in the form of brazing wire, bent to the configuration of the valve seats.

Brazed specimens were tested in a machine that applies not only tension and compression loads, but also torsion loads. Specimens cast in one piece were first tested, then those cut in two and brazed together again. Tests indicate full strength of the parent material cannot be developed by increasing area of the braze because of the stress raising effect of the discontinuity. Brazed joints are indicated as having a strength 65 per cent of the parent material. With ribbed construction, strength is increased to 72 per cent. Real proof of the strength of brazed joints lies in the use of such joints in an actual engine. To date, no brazed joints have given structural difficulty.

Die Castings for Stressed Applications — While aluminum die castings have been used for many years in automotive parts, few have been employed for structural applications. One reason has been that some aluminum die casting alloys have excellent test bar properties, not consistently obtained in actual castings.

An application was sought where the information so obtained in fatigue tests might be further proved in actual service. Such an application was forthcoming in the Nash clutch housing. Part was first made in cast iron (rough weight 17 pounds) and later as an aluminum permanent-mold casting.

For testing a permanent mold casting was installed on an engine in the laboratory. Static loads were applied, by pulling vertically on the housing and also horizontally.

The dynamic loads then were applied by attaching an out-of-balance disk to the rear end of the transmission case, and rotating it at various speeds. Entire weight of the rear end of the engine is supported on the clutch housing. Strains were measured by the use of Stresscoat, the strain-indicating brittle lacquer, and by Baldwin-Southwark SR-4 strain gages.

From information obtained, a design was prepared for a die casting. Next, came a sand casting duplicating as closely as possible intended die casting design. This part was tested.

The first die castings were put through the same series of tests. Finally, service tests in actual automobiles were employed. Favorable results of all these tests led to the adoption of the housing for production and thousands were made. To date, no service failure has been reported.

Plaster Process Castings — Advantages of plaster process castings form a fortunate combination for the production of torque converter parts. Nature of the vanes in a torque converter part make casting by conventional means impossible. Individual cores are produced of plaster, and assembled. Accuracy is required for the assembly. Variation as little as one-thousandth of an inch in each plaster core can accumulate to serious proportions when as many as 30 more cores are involved.

A technique was worked out that limited tolerances of the cores to plus or minus 0.0005-inch. Development of proper plaster mix also assures smooth surface finishes. Finished casting requires a minimum of machining.

Alloy for Radiators — Current and predicted future shortages of copper has caused the automotive industry to consider seriously the use of aluminum in radiators. Technical problems involving aluminum

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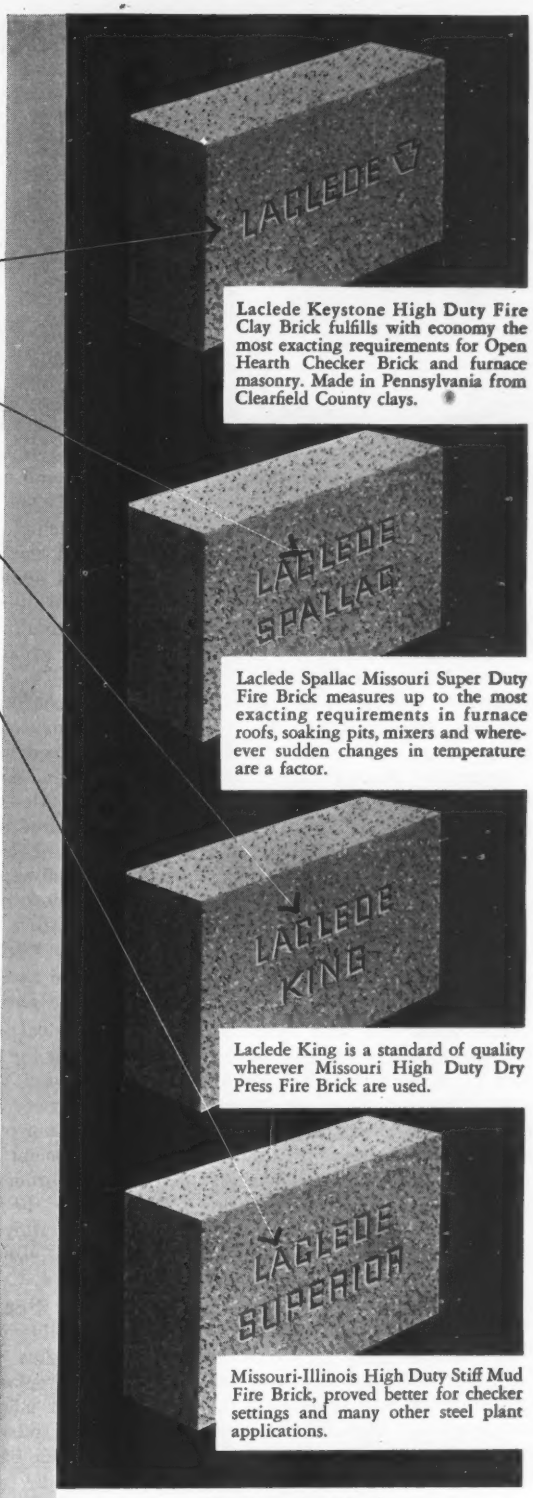

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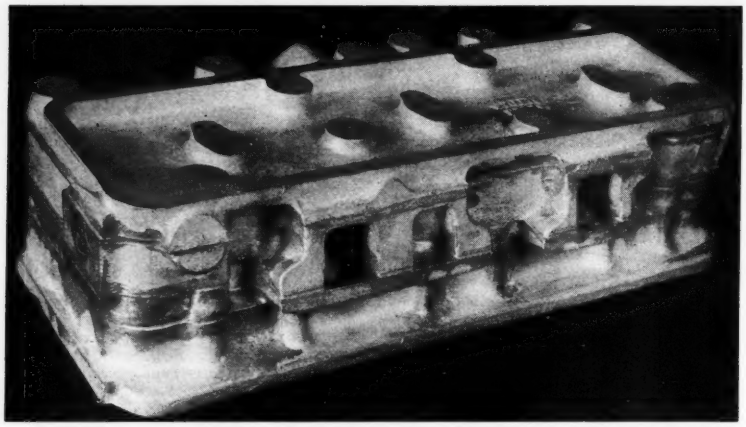

Completed cylinder head after brazing. Use of brazed cast sections eliminates intricate cores, other problems of producing head as a solid casting

radiators can be broken down into two principal phases: Methods of construction, resistance to corrosion.

Dip brazing appears to be the most desirable means for making the core. Method presents several advantages, among them closely controlled temperatures in the brazing range and elimination of a separate fluxing operation. Usually process involves a brief degreasing operation.

Assembly should then be preheated to 950 to 1000° F. Following preheat, unit is dipped into molten flux at proper brazing temperature. Normal brazing temperatures range from 1085 to 1190° F. Length of time in the dip furnace depends upon the unit involved.

Present answer to the corrosive action of various waters is found in the development of an Alclad coating which offers the proper electrolytic protection to the 3S core. With this product, whatever corrosion takes place goes as far as the interfacial layer and then continues laterally to arrest complete penetration for an extended period of time.

The problem of developing a suitable electrolytically protective coating for radiators, however, was complicated by zinc diffusion in the brazing cycle. Zinc in the cladding would diffuse into the core at brazing temperatures. Then the proper protection from corrosion was not available. Solution to this problem is found in No. XA30 brazing sheet.

Alloys for Finishes—Aluminum can be finished with all the presently used metal finishing techniques plus additional anodic finishes suited particularly to aluminum. Metallurgical considerations are of great importance in all cases.

Anodic coatings on aluminum have been developed to a high degree and provide a particularly useful finish. Anodic coatings developed by Alcoa have been given the trade name of Alumilite. Since it is a conversion coating, its transparency is directly related to both alloy and temper. Alzak reflectors are made with a clad sheet anodically coated. Recent research work has revealed new alloy possibilities for even brighter finishes.

Metallurgical considerations are as important for cast alloys as they are for wrought alloys in achieving a wide variety of finishes. Die cast aluminum parts have recently received special attention in this regard. In order to achieve proper fluidity in the mold, aluminum die casting alloys have required a relatively high percentage of silicon.

Although this alloying element gives desirable casting properties, it also creates problems for finishes. Inherent flow lines are emphasized by silicon and the basic color of the finish is darkened. Current research has brought out alloy XA214 die castings. Alloy has a nominal composition of 3.8 per cent magnesium and 1.8 per cent zinc. Effect of flow lines is minimized and a more lustrous finish results.

While the effect of alloying constituents is not always recognized in electroplated finishes, it is highly important. Oddly enough, magnesium, the constituent which creates a good anodic finish, is a troublemaker for plated finishes. At the same time, however, the newly developed zinc immersion process for electroplating provides excellent results when used with proper alloys.

Aluminum chrome plated in this manner is in current commercial use on die cast cylinders, kitchen appliances and numerous other articles.

One of the leading automotive manufacturers has used several thousand chromium-plated aluminum permanent mold cast bumper guards as service parts together with bumper guards and rear intermediate bumper face bars on several station wagon models with success.

Vitreous Enamels—For finish applications, vitreous enamels should be mentioned briefly. A recent development for aluminum, these enamels can be applied to all alloys with modifications of surface pretreatments. The fact that firing temperatures of 940 to 1000° F are required necessitates some special attention to the proper alloy selection.

These temperatures are in the heat treatment range for those alloys susceptible to heat treatment. The proper alloy selection can result in a satisfactory and serviceable part within the limits of the finish. Latest enamels for aluminum have both excellent mechanical and heat resistance plus good adhesion.

From data presented at the SAE national passenger car, body and materials meeting, Detroit.

Shipping Damage Drops

Losses due to damage in shipping have been greatly reduced by the National Rubber Machinery Co., Akron. This manufacturer of garbage disposers packs the 35-pound unit in a corrugated box made by the Hinde & Dauch Paper Co., Sandusky, O. The box has a 7-ply bottom pad to cushion the unit against shock. Shipped by truck, express and parcel post, total damage claims have been practically eliminated.

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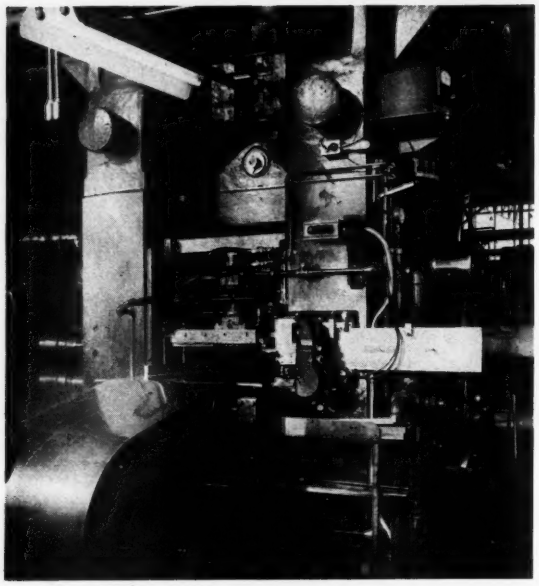
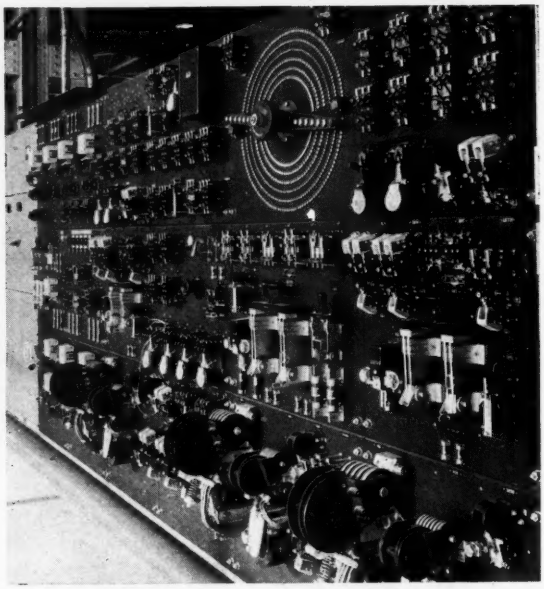


Mill rolls strip steel to customers' exacting specifications. Unit is 4-high single stand, reversing type



Main control panel for the 10 and 26 x 28-inch reversing mill. Mill handles coils up to 24 inches in width

Strip Rolling Adds to Warehouse Service

Steel warehouse meets problems of special requirements by rolling strip to customer specifications. Single stand reversing mill, 4-high, does the job

VERSATILITY of its warehousing services is increased at Production Steel Coil Inc., which operates steel warehouses in Detroit, Buffalo and Chicago. Addition of a 4-high cold strip mill boosts their ability to meet customer requirements.

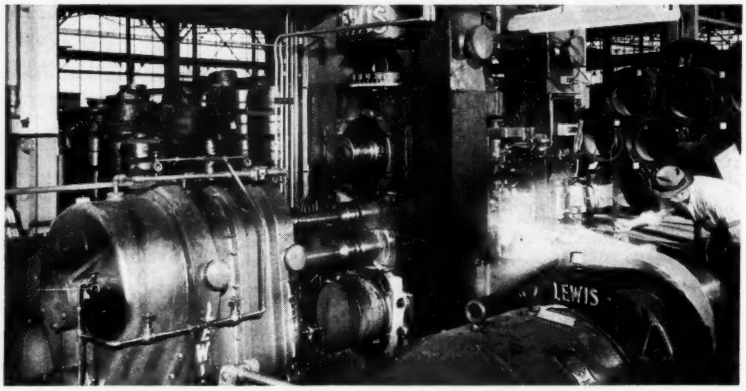
This firm was faced with the problem of supplying small lots of cold rolled strip steel in varied width, gage, temper and finish.

One of the Aims — Satisfying these demands and building flexibililty into its operations, the company installed a Lewis 4-high reversing cold strip mill to perform a variety of functions. One of the aims was to reduce stock sizes of hot rolled strip, in coils, to the desired gage and by further operations—annealing, temper rolling, slitting—meet additional requirements of temper, edge and finish in accordance with detailed specifications of customers.

Governed by the need for close gage tolerance across the strip, and to provide for substantial reductions per pass, the 4-high mill was chosen. Engineers of Lewis Foundry & Machine Division, Blaw-Knox Co., builders of the mill, and the management of Production Steel Coil decided to install a single stand 10 and 26 x 28-inch reversing mill with coil box on the entering side, and two reversing reels, one on each side of the mill.

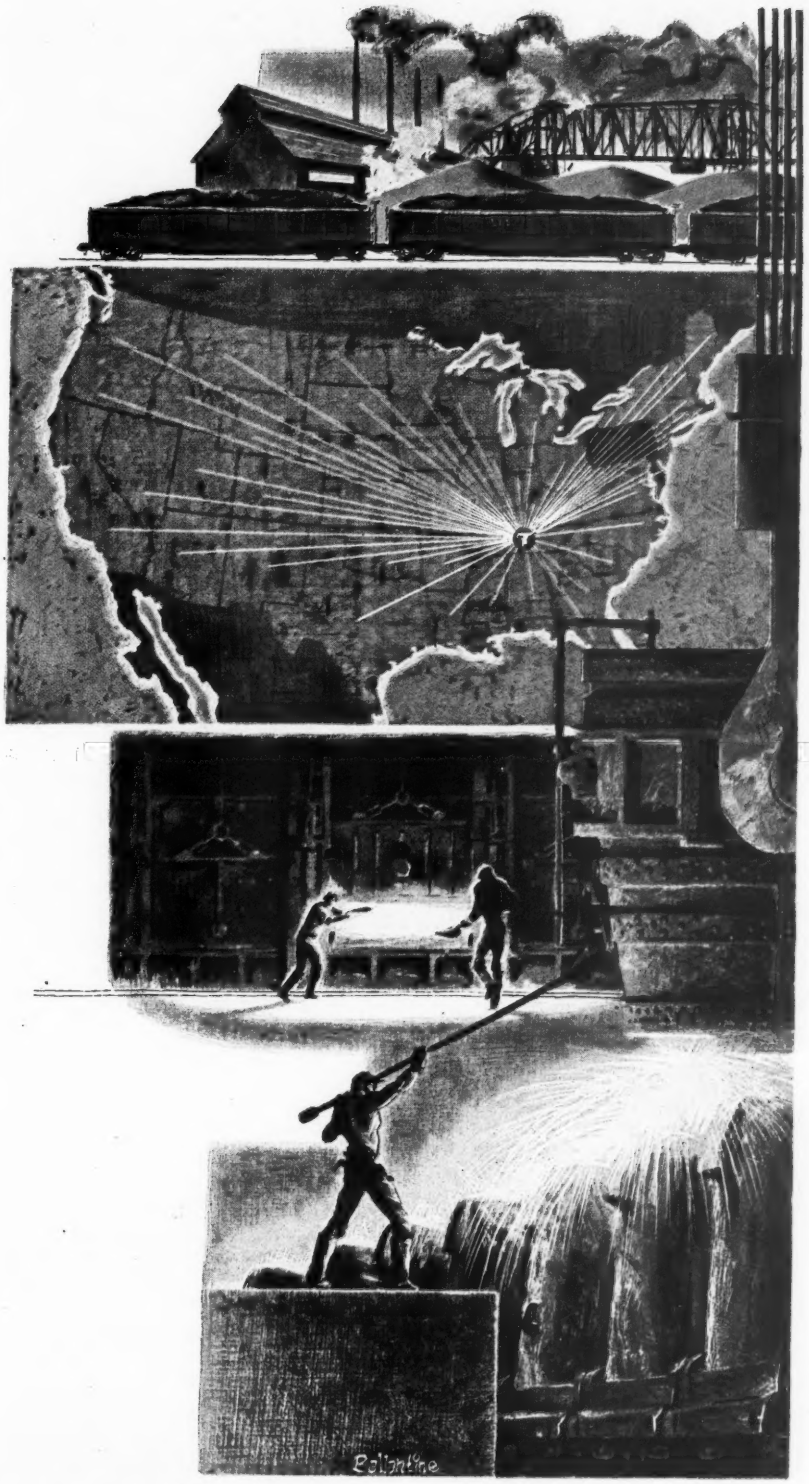
Permits Heavy Reductions—Mill is designed to permit heavy reductions per pass and at high speeds, up to 1000 fpm. Hot rolled strip 24 inches wide by 0.075-inch thick may be reduced to 0.024-inch thick in five passes, and in four or three passes on narrower widths.

Further processing procedure is adapted to the use of the material. Material for deep drawing is annealed either in coils or in cut lengths, and annealed coils can be temper-rolled by passing the strip through the mill again with a very light reduction.



This view is from the drive side of the mill. Designed to permit heavy reductions per pass, cold strip mill operates at high speeds up to 1000 fpm

THERE'S A TOUCH OF TENNESSEE IN PENNSYLVANIA STEEL



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The Truth About Fretting

Corrosion Problem Really Physical Change

It used to be known as "fretting corrosion." New studies show it to be strictly physical nature, any chemical reaction is secondary. Proper lubrication can ease the problem

CHANCES are good that a lot of the occurrences of fretting can be mitigated to the extent that they are no longer a problem. Reduction is made possible by information from experiments conducted by the National Advisory Committee for Aeronautics at the Lewis Flight Propulsion Laboratory, Cleveland.

Fretting, defined as surface failure that may occur when closely fitting surfaces experience slight relative motion, damages many machine parts subject to vibration. Often it can occur in shipping. It is principally characterized by surface stain, pitting and the generation of oxides.

Douglas Godfrey and Edmond E. Bisson at NACA observed fretting as it was formed. They performed exhaustive tests on the resultant debris, and also investigated various methods of inhibiting the action. Here's what they found.

Physical, Not Chemical—First, fretting is principally physical in nature. Any chemical action taking place is strictly a secondary factor. This is contrary to some theories which expressed the belief that chemical change of the surfaces took place and caused sloughing off of surface material.

Second, the initiating of fretting is independent of vibratory motion or high sliding speeds. It takes no great amount of relative motion, nor does it take a high rate of speed to cause fretting.

Here's how they determined the nature and behavior of fretting. A convex surface, for example a steel ball bearing, was mounted in contact with a flat surface, in one case a glass plate. The convex surface was then vibrated at various speeds and the fretting was observed with a microscope looking through the glass plate. Often it occurred after only thirty cycles. Of course, the greater the number of cycles completed, the greater the damage due to fretting.

Two of a Kind—Pattern of the spot on the flat surface was always similar to that on the convex surface. Fretting debris of steel was identified as Fe_2O_3 and the color changes that occurred suggest the progressive oxidation of the iron. Fretting is apparently initiated by the loosening, due to inherent adhesive forces, of extremely finely divided and apparently virgin material that is extruded and reacts with oxygen simultaneously. Examination of the ball after the experiment revealed a flat, oxide-encrusted spot.

Introduction of oil between the surfaces increased the time for the first evidence of fretting action some 50 times. Once the action started, however, the modifying effect of the oil was reduced.

Results obtained when metals other than steel were vibrated against glass slides supported the explanation of fretting deduced from the steel-glass experiments. In one case, flame-cleaned platinum foil supported by a steel ball was vibrated in contact with clean glass. The generation of a black powder in the characteristic way was observed. This powder remained black and that which adhered to the glass could be completely removed only by a 4-hour treatment in aqua regia. Color, acid resistance, electron-diffraction patterns and source indicated that the material was finely divided platinum. Because platinum will not oxidize in air at any temperature, the theory that oxidation is a primary cause of fretting is not supported.

Likewise Nonmetals—Independence of fretting from chemical action was also indicated in a group of experiments involving the nonmetallic, nonoxidizing materials with glass vibrated against quartz, ruby or mica. In all cases, the debris was produced, extruded and accumulated in the same physical manner observed with metal debris, except that no change in color took place. Fretting occurred to mica in the least number of cycles, the number required being progressively greater for Lucite, glass, quartz and ruby, which is also the order of increasing hardness of the materials. The tendency for fretting between the various nonmetals and glass and the amount of debris generated therefore appears to be inversely proportional to the hardness of the nonmetal.

Applications of many different lubricants were tried. The one which was most successful in mitigating the fretting damage was molybdenum disulphide. It can be applied in any of several different ways, but one of the best consists of bonding the MoS_2 to the surface.

By use of resin-forming viscous liquids such as asphalt-base varnish, the moly disulphide can be bonded to materials such as steel, aluminum, brass, stainless steel and glass. Rubbing of MoS_2, whether dusted or built up on or bonded by a resin to a surface, produced a distinctly preferred orientation.

Under Control—Results of these tests may lead to a virtual cancellation of many industrial fretting problems. Although the authors emphasize that fretting cannot be entirely eliminated, in some cases it can be retarded to such an extent as to become a negligible factor.

Alloy Steel Welding Outlined

Outline for solutions to problems in metallic arc, inert arc and other fusion welding of alloy steels is described in a booklet published by Solar Aircraft Co. Publication illustrates sources of common difficulties in alloy welding. It includes information on the company's back-up flux, designed to remove dirt and oxides and aid even penetration. Booklet is available free from the firm's Flux Dept., 2200 Pacific Highway, San Diego 12, Calif.

Stronger, Lighter Jets from Clad Metals

Composite copper-stainless may be a way to lighten the load and extend jet engine service life. Savings in critical materials is another result predicted

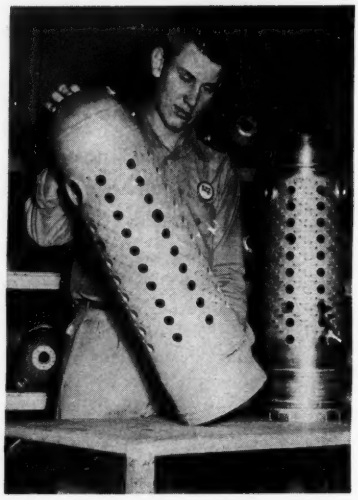
COMPOSITE copper-stainless sheets may improve jet engine service life and performance by giving heat-resisting alloys better thermal conductivity. If the Rosslyn metal sheet, lives up to metallurgical forecast, it should provide more speed, less fuel consumption and longer life for jet power plants. Other benefits are seen in piston-type exhaust systems. To test these high temperature possibilities, Ryan Aeronautical Co., San Diego, Calif., is making applications to exhaust chambers, afterburner vanes and exhaust headers.

Smoothly Blended — Blending copper's excellent heat conducting qualities with the strength and durability of stainless produces a product of superior conductivity. Laminate sheets have greater conductivity than copper under some service conditions. Even at 1500° F lateral conductivity compares favorably with the copper—which would oxidize to destruction if exposed directly to such heat.

Rosslyn metal's comparative conductivity is 57.2 per cent, based on copper's 100 per cent. At the moment heat penetrates any point of its thin stainless outer walls, the copper core conducts it quickly and uniformly throughout the entire sheet. This avoids hot spots. Such good thermal properties should improve performance of high temperature components substantially by eliminating ruptures caused by stresses between hot, expanded areas and surrounding cooler metals.

Two Types — For testing purposes, Ryan is fabricating combustion chambers from two types: 321 stainless-clad Rosslyn metal and 1010 mild steel-clad material. These are being service tested and results will be compared with that obtained with standard Inconel chambers. In the piston engine field, the company built exhaust system headers from 19-9DL stainless-clad laminate. These are operating in actual airliner test, installed on 3500-hp Pratt & Whitney R-4360 Wasp Major power plants. The parts maker is testing other high temperature elements, such as afterburner thermocouple vanes, that use the composite metal clad with Inconel.

The composite can be handled in these production applications in about the same way stainless or Inconel alone is processed. It can be formed, welded, machined or spun without difficulty if special attention is paid to its characteristics.

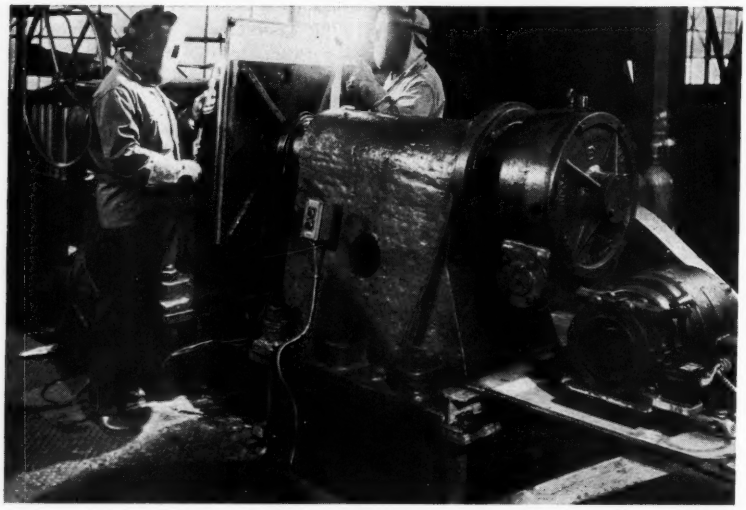


Performance of the Rosslyn chamber made from the composite copper-stainless (left) will be compared with that of the standard alloy unit (right)

Double Dividend — Ryan hopes two outstanding benefits will result from adaption of the copper-stainless to aircraft power plants: Savings in weight; savings in critical materials. A typical combustion chamber takes about 5 pounds of high temperature alloy. Each jet engine has about eight chambers, a similar number of transition liners, plus a large cone assembly and tail pipe. Substituting the sandwich-type material for straight chrome-nickel alloys would save 30 per cent of these scarce metals, since the composite sheet is 30 per cent copper.

Weight saving dividend is accomplished by taking advantage of the lateral heat-spreading qualities of the material and using lighter gages than would be possible normally with metals having less effective thermal conductivity. Sheet thicknesses with sufficient strength for the application would be the limiting factor in going to the lighter material.

Company estimates the percentage of reduction in rupture strength of Rosslyn metal at 1500° F over solid stainless is about half the percentage of copper in the material.



Squeezed together with 100,000 pounds pressure, sheets of copper and stainless steel are welded at the edges in fabrication of Rosslyn metal. This composite sheet material is a development of American Cladmetals Co., Carnegie, Pa.

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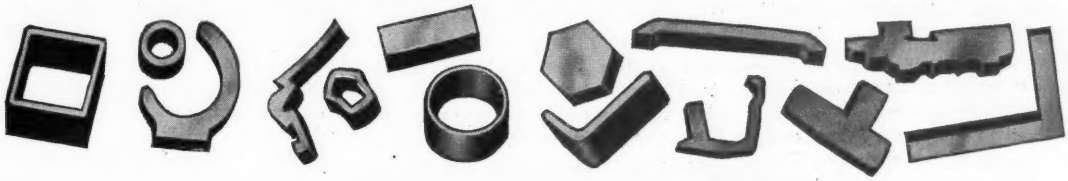

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Blast Furnace Practice . . .

X-Beneficiation of Raw Materials

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

Processes for treating natural iron ores, ore concentrates and flue dust, such as sintering, nodulizing, briquetting and pelletizing have now become a commercial necessity

ALTHOUGH blast furnace operation is primarily conducted for the production of iron, the output and disposal of gangue by-products require more attention in the direction and control of the operation than the iron production. The extent of the operating problems involved in the disposal of the gangue will always be determined by the character of the raw materials used.

Fuel, air, fluxing stone, and iron-bearing materials, constitute raw materials for blast furnace operation. Any treatment given to the raw materials before charging them into the furnace to facilitate the work of the operation, is a form of beneficiation. Since each raw material has received various degrees of treatment for many years the term beneficiation must be used with considerable elasticity.

Aside from raw block bituminous and anthracite coals, blast furnace fuels always have been beneficiated products since charcoal is the fixed carbon residue from wood distillation and bituminous coke is the fixed carbon residue from bituminous coal distillation.

Treatment of the Blast — For over 100 years air blast has been heated before it is delivered to the furnace. Since the turn of the present century intermittent attempts have been made to treat the moisture content of natural air before its delivery to the furnace. The influence, which the complexity of thermochemical reactions of furnace operation has had on engineering thought, is well illustrated by the addition to and the subtraction from the natural moisture content of the air before delivering it to the furnace. Enrichment of natural air with oxygen is a subject of both past and current interest.

Aside from rough crushing and screening to give a reasonable average particle size range, fluxing stone has not been beneficiated in the past; whether or not it will be in the future is a matter of conjecture.

Iron-bearing materials have received various degrees of treatment for many years but whereas the beneficiation given fuel and air always has been designed to directly serve the thermal and chemical reactions of furnace operation, the beneficiation of iron-bearing materials has almost exclusively been designed to produce a product which would be commercially competitive with materials marketable in their natural state, the benefit to furnace operation being indirect and commercial only. But the approaching exhaustion in the United States of naturally rich iron ores and better grades of coking coal is rapidly forcing beneficiation of the lower grade materials to a greater extent than ever before. Consequently, to justify the beneficiation cost, the products must be designed to serve the thermal and chemical reactions of the furnace operation in order to serve commercial economy to the best possible advantage.

Every blast furnace operation has certain *themal requirements* which must be met, and every operation has certain *thermal effects* created by the character of the raw materials used. A comparison of the thermal requirements and the effects for the three furnace operations using raw materials having a wide range in chemical and physical properties, indicated that those attendent to the reduction of Fe from the various stages of oxidation, and smelting it to specified chemical composition in the pig iron, will be reasonably constant and comparrable in any blast furnace operation, but those attendant to the disposal of gangue by-products can and will vary greatly. Despite this simple truth, a review of blast furnace literature indicates more consideration has been given to the simple chemical reactions governing the reduction of Fe to the metallic state than has been given to the more complex reactions governing the disposal of gangue by-products.

Treatment of Fuel — For most blast furnace operations commercial considerations favored and justified the use of raw materials in their natural state, with the ex-

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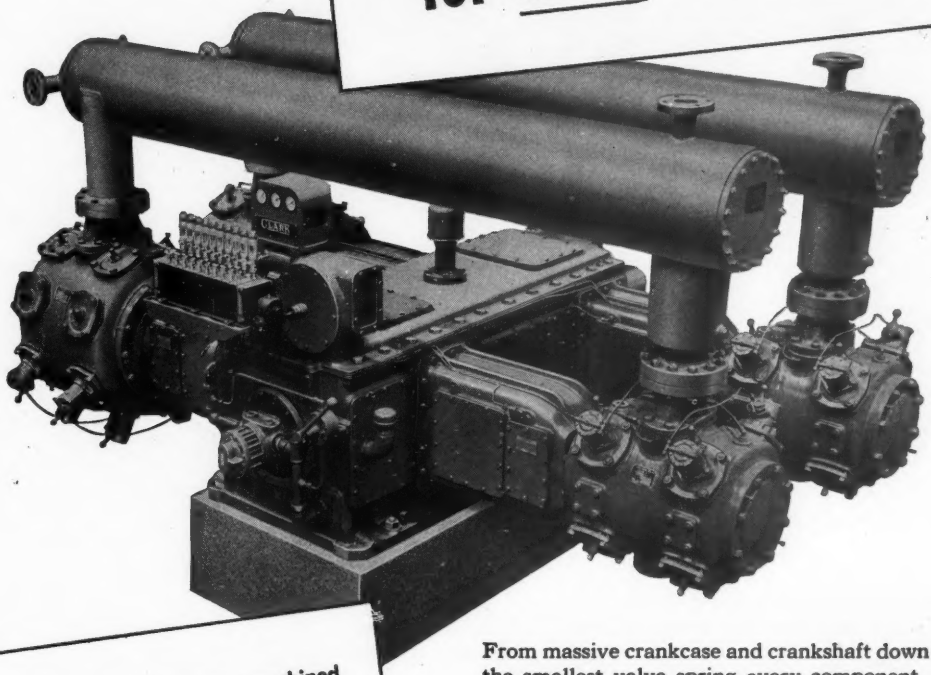

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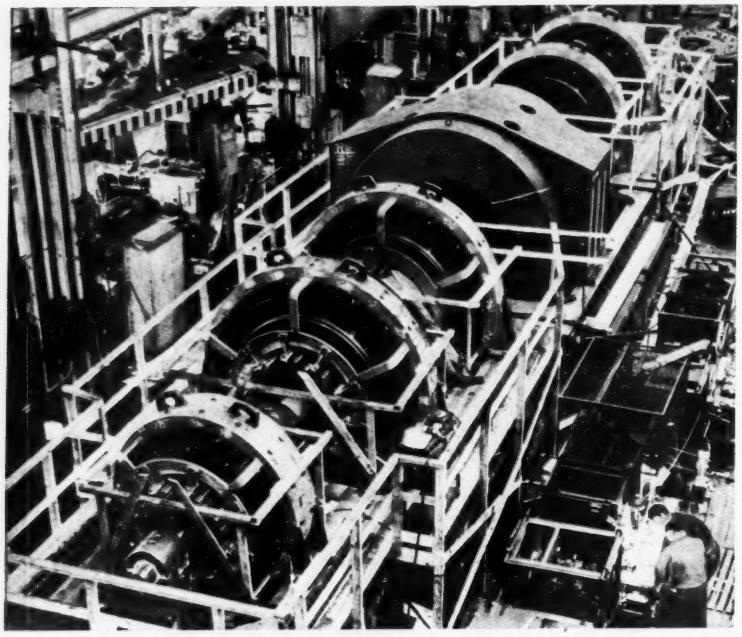

Power for a Four-Stand Mill

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ception of fuel. But where the considerations do not justify such use, the beneficiation of materials becomes a commercial necessity. This fact was clearly demonstrated in the development of blast furnace fuel. The historical review of the development of the industry cites the length of time covered in the transition and the development of blast furnace fuels. The need for fuel beneficiation now has become so universally recognized and established that it is accepted as a commonplace, with constant research being conducted to improve the degree of beneficiation. The history of the use of magnetite ore deposits in the Eastern district of the United States is an example of the economic necessity forcing the beneficiation of natural ore which is not competitively marketable in its natural state, but when fully beneficiated it permits a furnace operation equal or greater in productivity, and more economical thermally, than with naturally rich soft ores.

Because of these known and proved benefits to operating economy in a few furnace operations, the present need for beneficiating ore and coal for many furnaces, can be accepted with the assurance of economic success provided the beneficiated products produced and the operating practice methods used at the furnaces, are designed to serve blast furnace operating principles rather than to maintain practice methods which are applicable to natural materials only.

In the study of any raw material beneficiation program consideration of two basic furnace operating principles, previously stressed in this discourse, is believed to be of vital importance, namely:

1. The productive capacity of every blast furnace is determined by the relation between the raw material preparation capacity of the shaft and the smelting capacity of the bosh and hearth with the division having the lesser capacity determining the productive capacity because of the combined divisions.

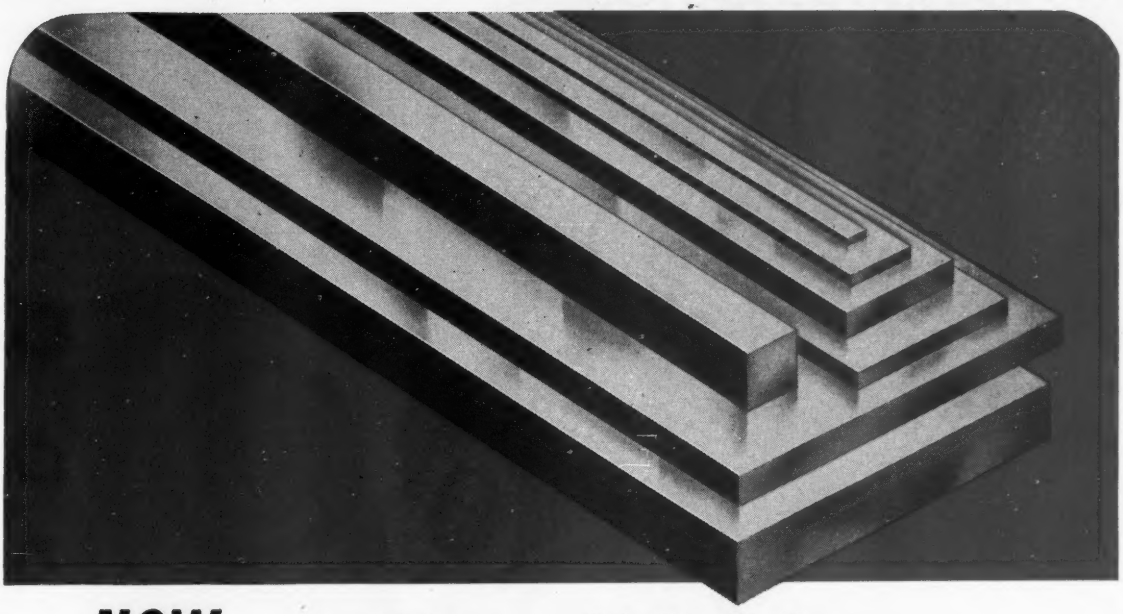
2. The advantage of having the bosh and hearth operation as the limiting factor in the furnace productive capacity because it affords the opportunity for a greater recovery of latent heat from the top gas, and for the return of it to the stack as hot blast.

With these two principles accepted and used for guides in raw material beneficiation, the results which may be expected from the beneficiated product and the adjustments which must be made in operating practice methods, are readily predictable.

Iron Ore Beneficiation — From the premise that the concentration of iron oxides contained in low-grade ore is always the primary step in ore beneficiation, the only advantage or disadvantage to furnace operation of the products from second step processes need be considered. The ideal iron-bearing material for the furnace burden may be said to be one rich in iron, free from volatile matter, and low in gangue content, with the gangue chemical constituents having a ratio to each other, and to the coke ash, which will produce slag having a mineral composition favorable to the conservation and concentration of heat in the lower bosh. The product should have sufficient structural strength to prevent packing in the furnace, and a particle size range which will force maximum gas-solid contact in the furnace shaft by offering a maximum resistance, without restriction, to gas flow.

Sintering, nodulizing, and briquetting are processes for treating iron ore and flue dust which have been fully demonstrated in actual practice. All of these processes may be applied to natural ores or to ore concentrates. Pelletizing is a new process, not yet fully demonstrated on a commercial scale, restricted to extremely finely ground taconite concentrates, and essentially is a form of briquetting.

At the turn of the present century when ores from the Mesabi Range were first used as the major part of blast furnace burdens every furnace plant developed an accumulation of flue dust which in the course of time grew to prohibitive proportions and means had to be found to recover and prepare it for recharging into the furnace. It was then that sintering, nodulizing, and



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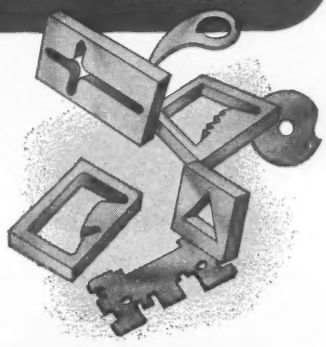

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briquetting, were introduced to the ferrous industry, with sintering being the only one of the three to survive the test of time. With nearly a half century involved in the test period it must be accepted that sintering survived on its own merits. It seems advisable to cite this fact because of the revival of interest in the comparative values of the three processes for the preparation of iron ore fines. The exigency of the present ore problem has brought forth numerous claims of control in the processing and for properties imparted to the products of the respective processes, many of which are open to question when considered in relation to the principles involved. Any ore beneficiation process simply produces a product which will better serve blast furnace operating principles without changing those principles.

Future of Sintering—Because the operating principles involved in the production of the three products, and the product characteristics, have not changed from what they were 30 to 40 years ago, opinion is offered that eventually sintering will be as generally accepted for the preparation of ore as it has been for flue dust. The only difference between ore and dust sintering being that ore usually will be a secondary step and flue dust alone always primary.

The value of sinter for burden material has become somewhat controversial during the past decade probably because of (1) the misconception of what may reasonably be expected from the sintering operation, and (2) the failure to recognize, or the reluctance to accept, the need for adjustment in furnace practice methods as the percentage of sinter in the furnace burden varies.

To sinter is to fuse, and with fusion, the oxides will be changed to silicates to the extent of the silica in the mix, and the physical properties will be changed from the fine particle size to the clinker.

Chemically, all volatile matter will be evolved from the raw sintering mix, and the nonvolatile matter in the sinter will increase in direct proportion to the percentage of volatile matter evolved from the raw mix. Consequently, the therm-

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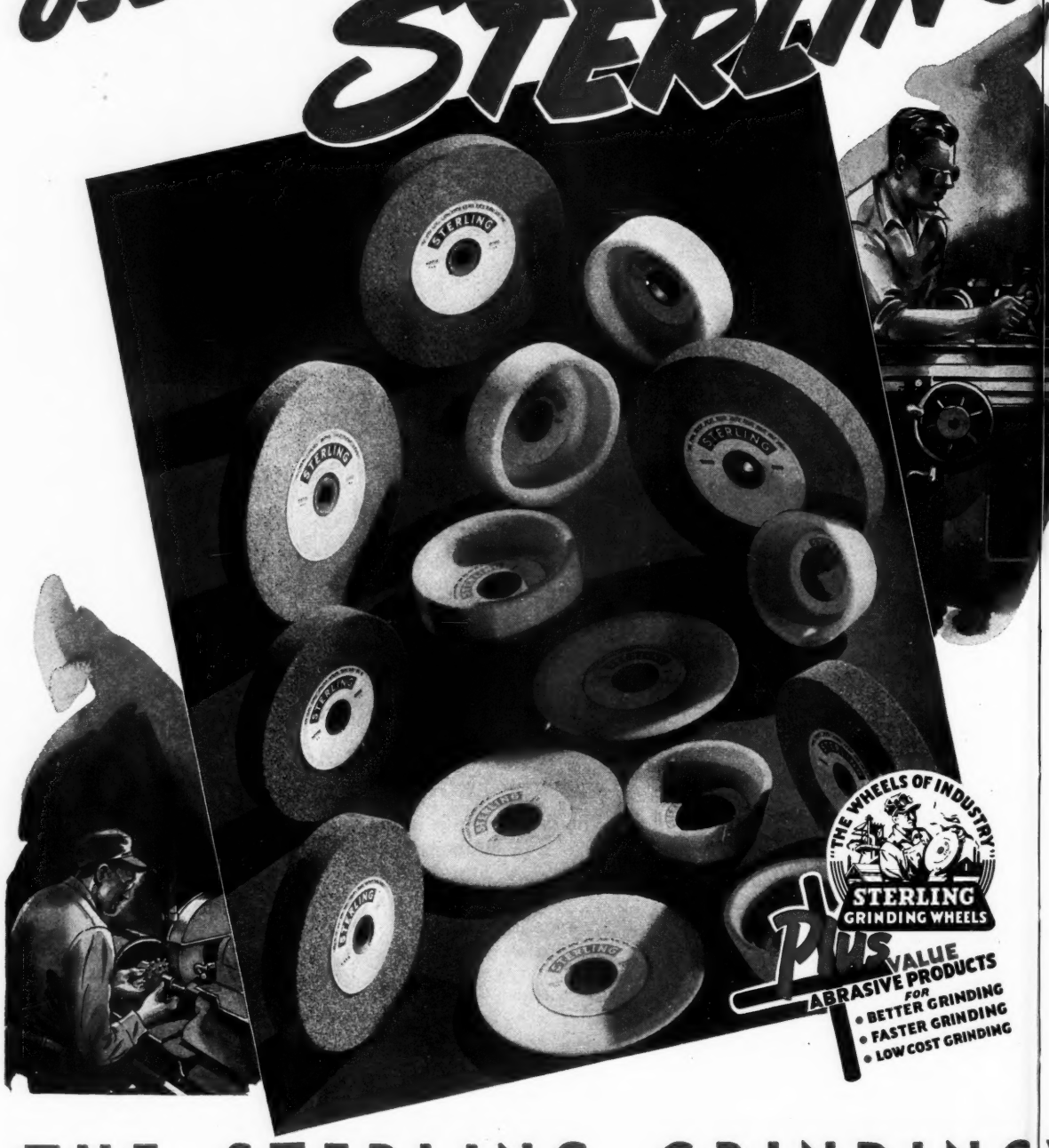

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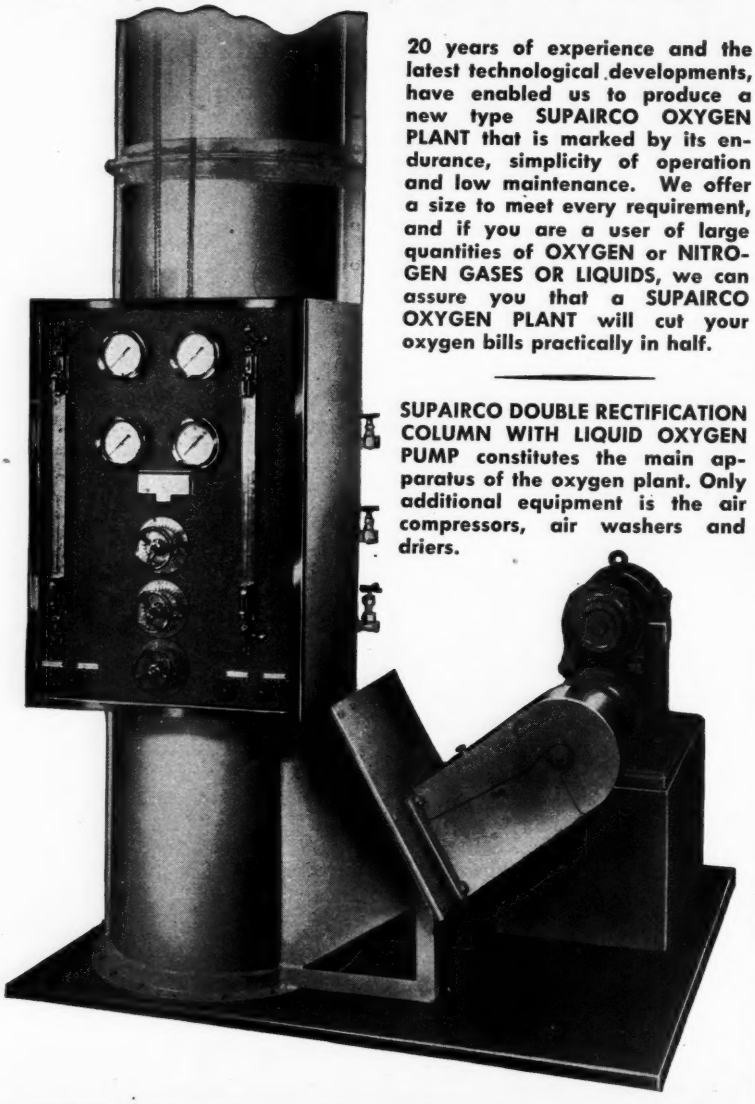

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al work in the furnace shaft preparing the sinter for smelting will be reduced in proportion to the percentage of volatile matter evolved in the sintering operation, and the thermal work in the bosh and hearth smelting the sinter will be increased in proportion to the increase of the nonvolatile matter content of the material charged into the furnace. Part of the nonvolatile matter in the sintering mix will be changed from oxide to silicate formations, the percentage and chemical composition of the silicates being determined by the existing percentage of silica and the ratio to each other of the nonvolatile constituents.

Physically, sinter when completely fused will be a hard cellular product, with the degree of structural strength, and/or nautral friability varying with percentage and chemical composition of the silicates formed.

Sinter Benefits Smelting — The property changes cited are the only ones which reasonably can be expected from a sintering operation, and, which are the of greatest possible benefit to the furnace operating economy since they, (1) reduce the work in the furnace shaft and thus reduce requirements for the shaft heat, and (2) increase the work in the bosh and hearth, thus providing means for the use of higher blast temperature and the return to furnace operation of the greater percentage of latent heat (CO in top gas) normally lost to furnace operation. Both of these benefits contribute to a lower fuel rate without the loss of furnace productive capacity.

Affect on the reducibility of iron silicates contained in the sinter is probably the most controversial chemical item concerning sinter production. Elsewhere in this discourse it has been pointed out that while unquestionably more heat is consumed for the reduction of iron (Fe) from the silicate than from the oxide because of the necessity for separating the iron oxide from the silicate compound before the oxide reduction can be effected, it cannot justly be considered a separate thermal charge against the furnace operation because the same amount of heat would be consumed anyway in the formation of

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slag whether the gangue of the silicate entered the furnace compounded as silicate in the sinter or as oxide in the ore. This opinion is supported by the actual operation in Eastern district furnaces where sinter comprises the major part of the burden and, consequently, there is always a substantial percentage of iron silicates in the burden. Moreover, the furnaces constantly have lower fuel rates than furnace operations using natural ores.

Actual furnace operation demonstrates that the affect of iron silicate compositions upon the structural strength and particle size of sinter is of far greater importance to the thermal economy than the volume of heat required for reduction because of the particle size affect on the gas-solid contact and the recovery of heat which makes reduction possible. Therefore, with a partial sinter burden, the small particle size of the sinter is an advantage, and with a total sinter burden it is imperative.

Involves An Adjustment—With the characteristic sinter properties cited there must be an adjustment in operating practice methods at furnace plants when the percentage of sinter in the burden creates a critical relation between the requirement, delivery, and recovery; of the heat volume in the shaft operation. The need for this adjustment and the reluctance to accept it, is the crux of the sinter controversy. Because the use of sinter reduces the thermal work of the shaft operation in direct proportion to the amount of volatile matter evolved, a proportionate adjustment must be made in the volume of heat delivered to the shaft or there will not only be a sacrifice of fuel but the opportunity will be created for the formation of scaffolds on the furnace sidewall. This phase of the thermal effects has been discussed in the first article of this series.

Eastern district furnacemen, who have most successfully used sintered concentrates for the major part of the furnace burden, have learned the economic advantage through the use of reduced blast volume, heavy burden ratio to coke, and high blast temperature, *without the sacrifice of furnace pro-*

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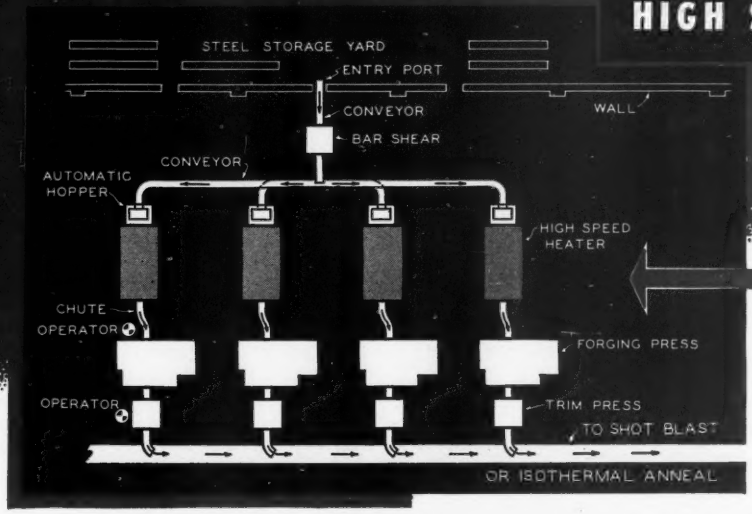

NOTE 'SURFACE' AUTOMATION *in this 'Surface' High Speed Heating installation in a large shop of the future.*

YOU'LL HEAT PIECES UNIFORMLY AND AUTOMATICALLY from billet to billet with automatic cycles in a 'Surface' High Speed Heating Furnace. What's more, you'll produce more forgings in the same space with less manpower.

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ductive capacity (see East heat balance calculation, Part VIa). Furnace operators in other districts, who have attempted to maintain, or increase, the blast volume used with volatile-bearing natural ore after the substitution of volatile-free sinter beyond the percentage which creates the critical thermal relations heretofore cited, have been disappointed with the results obtained. The thermal effects created with such attempts are contrary to blast furnace operating principles, and with them the results will always be disappointing whether the volatile-free material used is sinter or some other volatile-free material. This opinion is based on the principle that the practical blowing rate is always a variable volume of blast governed by the character of the raw materals used, and is determined by the need and the efficient use of heat volume in the shaft operation, rather than a fixed volume based upon the working volume of the furnace.

Nodules Are Comparable—The product produced with the nodulizing process is comparable to sinter since both affect the comparable chemical and physical changes in the materials processed. Because fusion occurs in both processes the formation of iron silicates is inevitable with both processes. A true nodule is a rounded lump while sinter has a cellular structure; therefore, the advantage to gas-solid contact in the furnace with particles of equal diameter would be with sinter because of the greater ratio of surface to mass. However, the advantage cited is more academic than real because the length of time required for either material to pass through the furnace would nullify advantage held by sinter.

The real advantage of sintering over nodulizing lies in the commercial economy of the two processes. For any given raw material conditions the equipment needed to serve either a kiln or a sintering machine will be virtually the same, but the cost of the processing fuel, operating delays, and maintenace costs, are less with sinter than with nodules. These are the factors which enabled the sintering process to survive for the past 30 to 40

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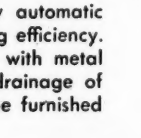

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years and the advantages have not changed.

Briquettes and Their Production — Any briquetting methods are simply modifications of the iron foundry coremaker's art. There never has been any question about the ability to produce briquettes, only the economic practicality of doing so needs consideration, and the value of the product to blast furnace operation if produced. With the iron ore having a reasonable degree of natural plasticity and particle size range which permits a simple mixing operation with binder material, it is possible to produce briquettes at low cost, but such conditions are exceptions rather than the rule, and for flue dust they simply do not exist. With the exception of the ideal conditions mentioned, any comparison of costs per unit of product, between briquetting, sintering, and nodulizing, will be favorable to sintering and nodulizing. Moreover, the latter products also have chemical and physical properties more favorable to blast furnace operation.

The effect of briquetted products on blast furnace operation cannot be any different than the action of any lump ore of similar chemical composition. Gas-solid contact will be in proportion to ratio of surface to mass. Aside from the monetary cost of producing briquettes their value as blast furnace material will always be determined by their effect on gas-solid contact in the furnace.

Pellets and Their Properties— In all essentials the pelletizing process is simply a modification of the briquetting process. Judging the product from the characteristics indicated at pilot plant operations its effect on blast furnace practice can be predicted with reasonable assurance of accuracy because of the manner the characteristics serve iron ore beneficiation principles.

The indicated properties of the freedom from volatile matter and recommended particle size range (from plus 0.50-inch to minus 1.25 inches) would tend to offset an advantage with a disadvantage. Freedom from volatile matter would benefit shaft operation of the furnace, but the particle size because of lessened gas-solid contact

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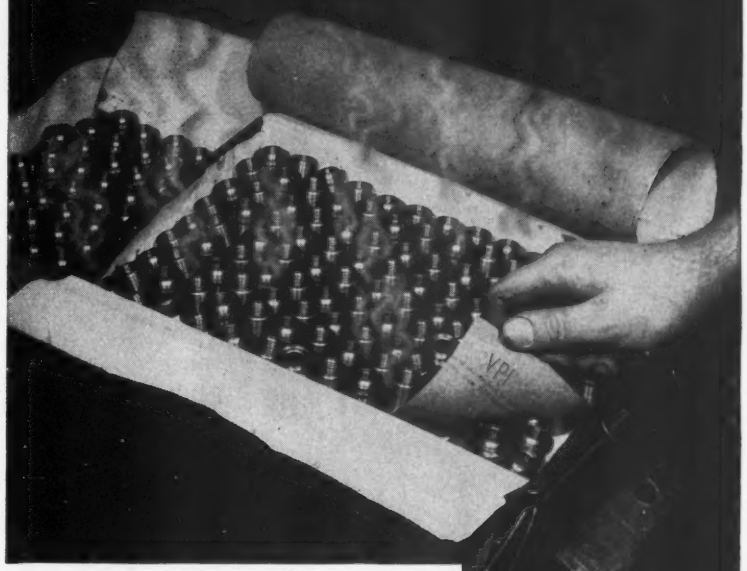

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would tend to destroy the benefit if the product was used in any appreciable percentage of the furnace burden. Beyond the critical percentage governing maximum gas-solid contact, adjustment in the blowing rate and the delivery of heat to the shaft would be necessary, the same as it is for any other volatile-free burden material when such materials become the major part of the furnace burden.

Pellets produced from concentrates, which are rich in iron and low in gangue content, would be a distinct advantage to the bosh and hearth smelting operation, but they could not be utilized to full advantage so long as conditions in the shaft were unfavorable to their preparation for smelting. The reasoning presented is consistent with principles of iron ore beneficiation which were presented earlier in this series.

Effect of Coke Properties—As previously mentioned, aside from anthracite and block bituminous coals blast furnace fuels always have been beneficiated products. The high percentage of fixed carbon and freedom from heavy volatile hydrocarbons are primary requisites of blast furnace fuel. Exhaustion of forest growth near ore deposits forced the use of mineral coal to replace wood charcoal and the need for fast burning fuel having firm structural strength to meet operating conditions attendent to smelting soft earthy ore, forced the use of bituminous coke.

The development is a clear demonstration of the necessity which forced research and beneficiation methods, and with it, coke produced from bituminous coal has virtually become the universal blast furnace fuel throughout the world. A casual knowledge of the steps involved in the development of beehive and by-product ovens, washing and blending of coals, and the control of coking time and oven temperature, is well known to all operating personnel of the blast furnace industry. It is not the purpose of this discourse to amplify details of those steps because that subject is more within the province of the coke producer, but an attempt will be made to discuss coke properties

Effect of coke chemical properties on furnace operation is largely reflected in the influence of coke. ash on slag formation. This phase of the subject has been presented earlier in this discourse.

Effect of coke physical properties on furnace operation is largely reflected in the influence which coke particle size has on shaft operation. Particle size of coke is governed by physical properties of strength, hardness, and brittleness. The physical character of coke, determined by the relationship to each other of the three properties cited, is indicated by a fuel index figure calculated from results of tumbler tests.

Although the effect of coke chemical properties on blast furnace operation is easily discernible, it is most difficult to evaluate any relationship between a fuel index figure for the physical properties and furnace operation. This condition has been clearly stated by Russel and Perch.[18]

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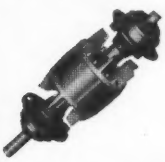

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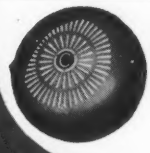

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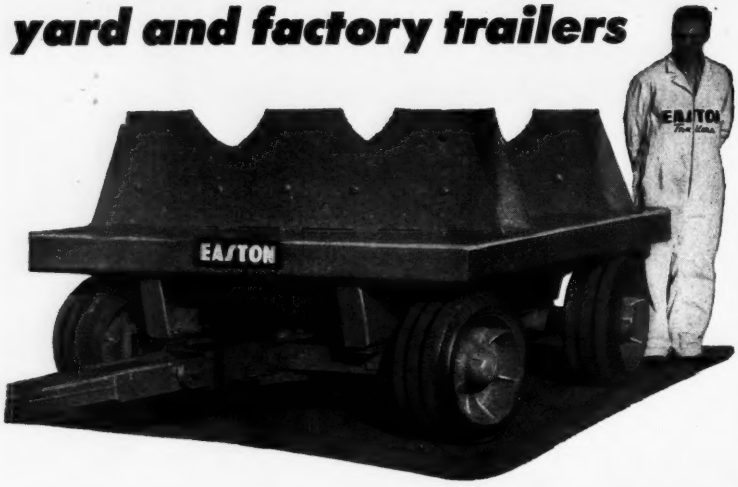

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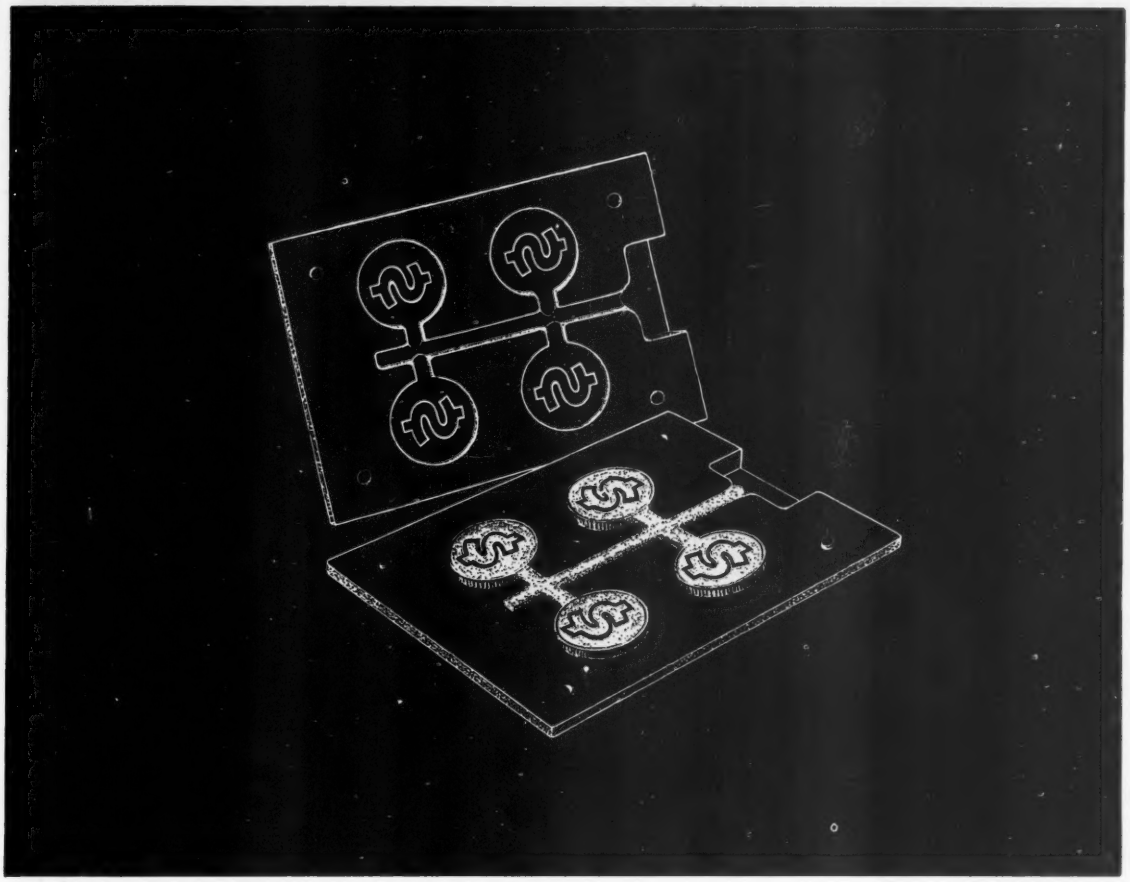
which blast furnace operation can be predicted from physical properties of the cokes. Undoubtedly the most important justification for thorough and frequent testing is the knowledge of changes which occur."

Obviously, tumbler tests of coke must be made as a guide for the coke plant operator, but since the tests indicate physical properties they do not tie in with blast furnace practice data which are largely governed by chemical reactions.

Serves as an Indicator—Because of the consistency with which brittleness runs counter to hardness and strength, and strength so closely follows the index figure, the figure might reasonably be regarded as an indicator of the particle size of coke. But because of the many variables connected with blast furnace operation it is difficult to indicate with certainty any operating condition which is due entirely to slight changes in the coke particle size *so long as size does not vary from charge to charge while filling the furnace,* if filled by volume.

It is generally accepted that coke is an important factor in determining the permeability of the furnace stock column to the gas passage. Obviously, the degree of such an effect will be governed by the relation of the particle size of coke to the particle size and character of the burden materials; therefore, the preferred particle size for coke might be said to be a variable. However, many furnace plants successfully use a minus 3-inch and a plus 1-inch size range. The gas-solid contact in the furnace shaft is always a vital operating principle which must be served, and, although preferable served by small size burden materials rather than small size fuel, the reversed condition is preferable to an inefficient gas-solid contact.

Variable range in the coke particle size will have a serious effect on the bosh and hearth operation if the coke is filled by volume because of the size effect on weight of fixed carbon per cubic foot of coke. With the ore held to a constant weight per charge, the carbon weight per charge must not vary beyond reasonable limits within which a variation in heat generation can be equalized with ad-



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justments in blast temperature.

Based upon long operating experience opinion is offered that uniform sizing of blast furnace coke is of far greater importance to furnace operating economy than any physical properties caused by a difference in coking time or other conditions under which coke is produced.

(To be continued)

[18] Technical Publication, No. 1520, 1942, A.S.T.M., Russel and Perch.

Management Training Cited

Manpower shortages now threaten within the ranks of management. Key is training

"ONLY LATELY has management become fully aware that it is suffering from a dearth of manpower within its own ranks. This shortage is critical. Right now it is becoming the ceiling on profitable production in many companies."

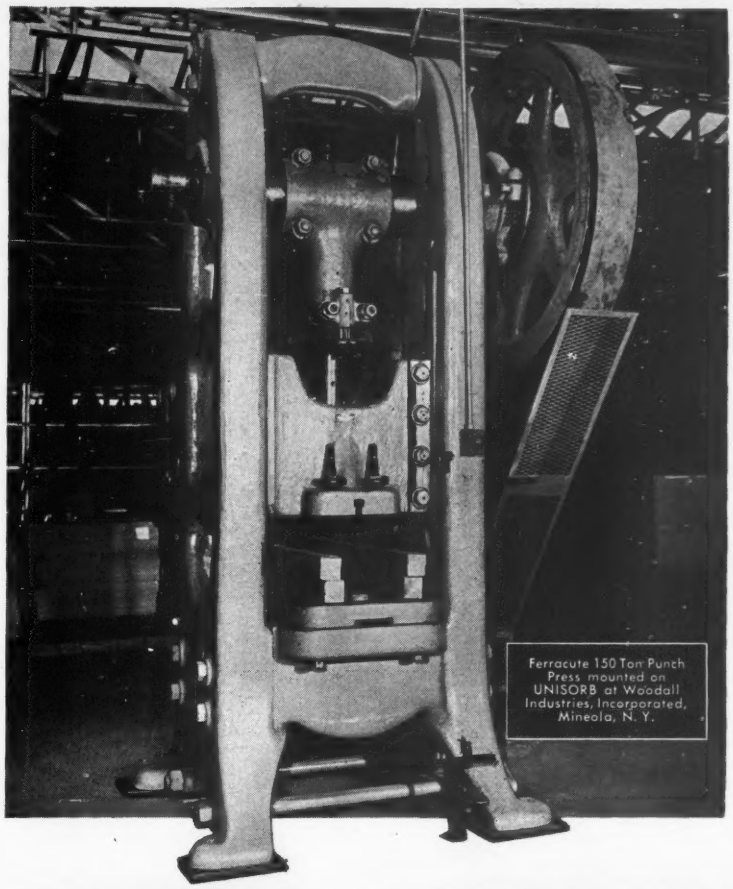
So said Louis A. Allen, manager of personnel administration and training, Koppers Co. Inc., Pittsburgh, in his address to the manufacturing conference of the American Management Association.

The Tonic—Any business that is to stay healthy must assure itself of a continuing supply of effective management people. Since the outside sources of supply are rapidly drying up, the companies most successful in meeting their management manpower requirements will be those which are most successful in getting the best out of the people they already have.

This necessity for internal development of management talent is one reason why training has become increasingly important during the past few years. In fact, the pressure on training staffs has been so great that the field of industrial education has been undergoing a forced growth.

Calculated Training—Because of both internal and external changes, training activities are now coming to be looked upon as tools to help improve production; they are being used in the same scientific spirit as time and motion study, preventive maintenance and job evaluation.

Really successful training programs cannot be superimposed on



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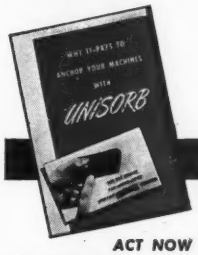

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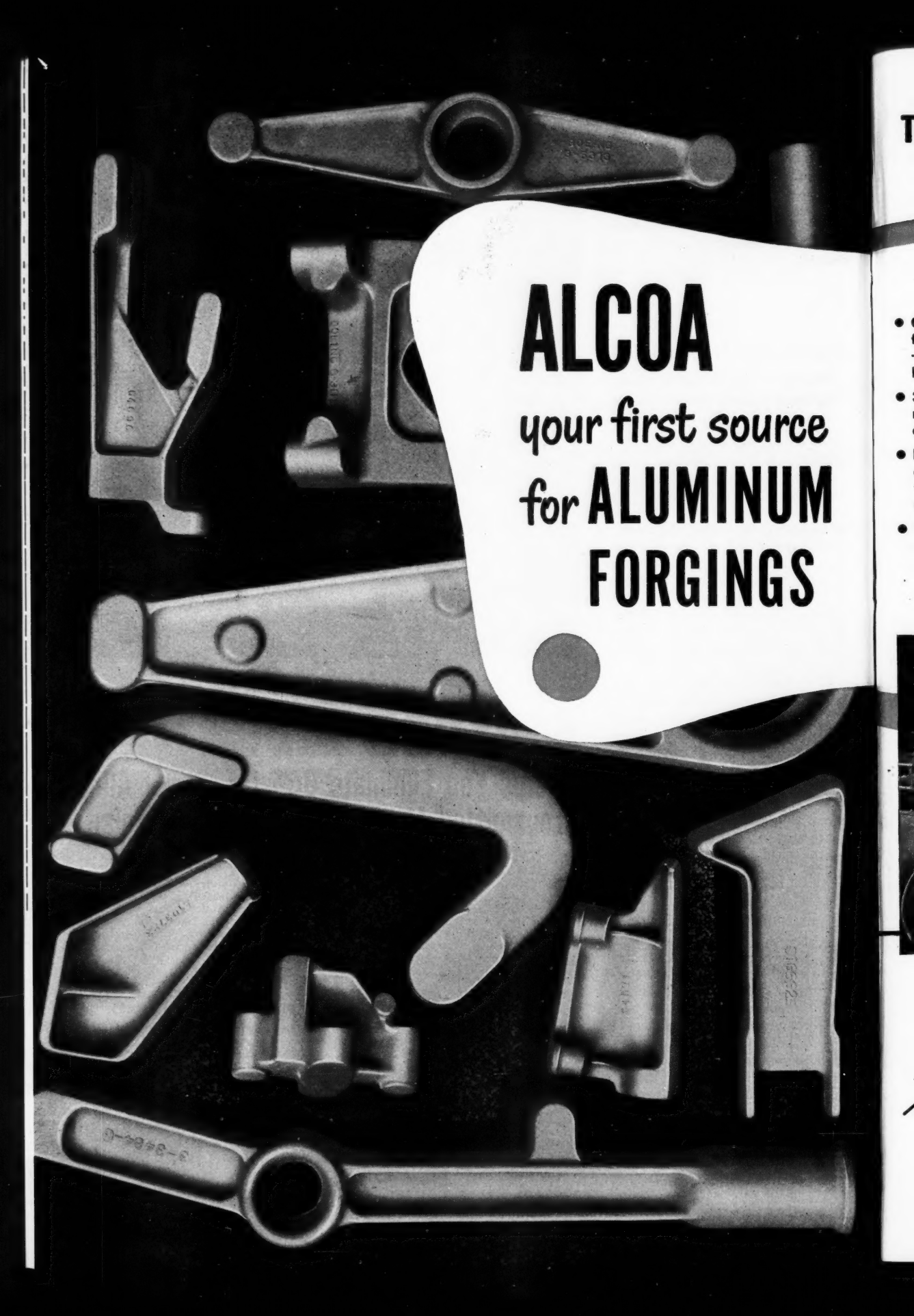
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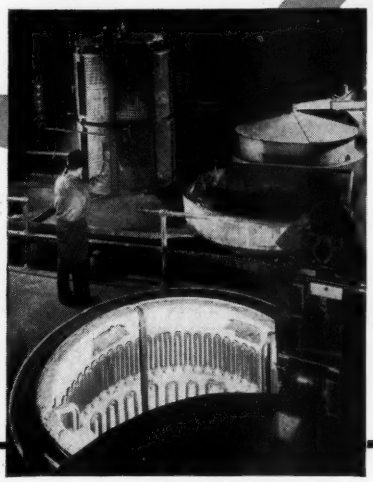

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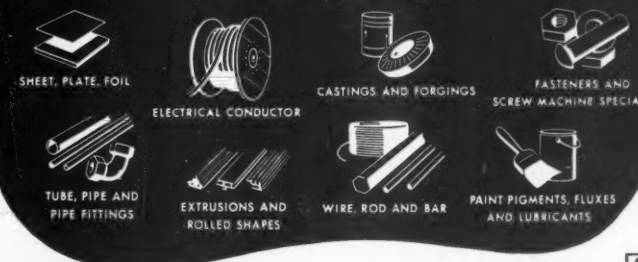

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the management group like a blanket. Often it is best to talk to the department head involved. Find out what he thinks and needs in the way of trained personnel. Then when the program is set up, wherever possible the training is done by people in the department. Close tabs are kept at first of the before and after results of the program. Where results are not as desired, revisions are made until the program is working and producing up to snuff.

One Role—Many times there is a tendency to consider training an extra-curricular activity. This attitude not only sells training short, it is wasteful in terms of dollars and cents. Mr. Allen points out that in his company they have tried to make training a tool of management by turning the training function over to the line organization as quickly and completely as possible. Difficult as it may be for the trainer to accept this role, it is the only realistic one he can occupy if his program is to be accepted by line management on the basis of its accomplishments.

Training is economical for the long term only when it becomes a part of the supervisor's job responsibilities. There are counter arguments that training is best conducted by a staff man who comes before a group of supervisors for a couple of hours, teaches his class, and then goes on to another group. But evidence seems to be accumulating to show that while this way may help develop some excellent staff instructors, it may or may not pay its way in competition with other expense items. It does seem to give training a peculiar status: As the training program grows, the need for staff instructors increases, and the more overhead builds up, the further training moves from the hands of the people who should be handling it—plant supervision.

Trial and Error—There is a general agreement that over 80 per cent of the supervisor's job lies in working with people on the job. Both the case method and role playing make use of the pressure of group censorship to accomplish changes in attitude and action. By providing the opportunity for supervisors to get together for the purpose of studying case histories

Complicated Castings?

H-P-M "400" Die Casters Produce them for *Mall* Tools!

Mall Tool Company reports—"Our three H-P-M Die Casters work 17 hours a day, 5½ days a week and are giving excellent service".

Mall's famous line of portable tools calls for a wide range of die castings . . . many of them complicated castings of intricate design . . . all produced on H-P-M's.

H-P-M's new Model 400-B high speed die casting machine, with built-in nitrogen accumulator, offers injection speeds up to 400 ft. per minute and produces aluminum castings weighing up to 12.2 lbs. Other design features include all-hydraulic die clamp for fast, simple die change-over . . . hydraulic ejectors . . . dual hydro-electric safety devices . . . maximum injection pressure when die is filled . . . and independent handwheel adjustment for both die clamp and injection pressures.

Discuss your die casting problems with an H-P-M engineer and profit from 75 years of specialized experience in the field of hydraulics.

SPECIFICATIONS MODEL 400-B

Size of Die Plates	Space Between Bars	Die Opens	Maximum Die Space	Capacity Per Shot (Lbs.)	Net Wt. (Lbs.)
38"x38"	23"x23"	16"	42"	2.2 to 12.2 (Al)*	40,000

**NOTE: The model 400-B handles brass and magnesium die casting as well. Complete specifications on request.*

Write for Catalog 5106, today!

HPM 75th YEAR

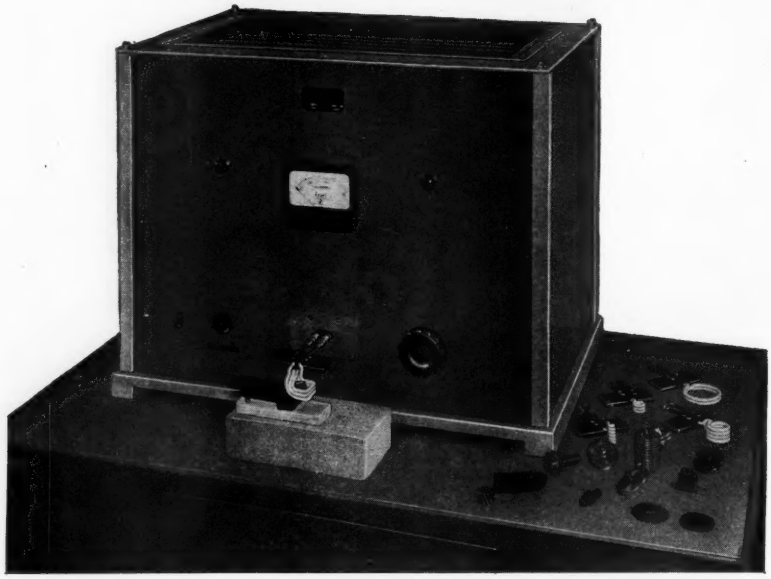
THE HYDRAULIC PRESS MFG. COMPANY

1044 MARION ROAD
MT. GILEAD, OHIO, U. S. A.

Builders of Presses for the Metal Working & Processing Industries • Plastics Molding Presses • Die Casting Machines • Hydraulic Pumps, Valves & Power Units

LepeL presents

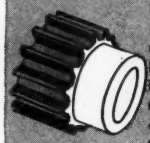
A *Low Cost* PORTABLE HIGH FREQUENCY *Induction* HEATING UNIT



BRAZING

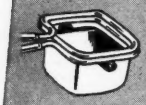
Permits widest choice of silver or copper brazing alloys from lowest to highest melting points. Ideal for brazing carbide tips.

HARDENING



Heat localized exactly where wanted at desired temperature. Ideal for gears, cams, bearing surfaces, cutting tools and other areas that are subject to wear.

SOLDERING

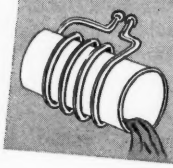


Speedily and neatly performs intricate soldering applications with or without the use of pre-formed rings.

ANNEALING

Ideal for annealing, stress-relieving, normalizing or pre-heating selected areas.

MELTING



Readily melts quantities of ferrous and non-ferrous metals in either graphite or ceramic crucibles.

- **SMALL AND COMPACT**
  Conveniently operated on bench or table—no mounting necessary.
- **ECONOMICAL OPERATION**
  No special power installation required. Operates on 110 volts, 60 or 50 cycle line at unity power factor.
- **FULLY GUARANTEED**
  Guaranteed for continuous duty cycle and stated performance.

This versatile unit is priced so low that every shop may now take advantage of modern induction heating techniques to improve quality and to increase production. Its simplicity of operation eliminates the need for skilled personnel.

The Lepel Model 2 KW will meet the requirements of machine shops, toolrooms, research laboratories and educational institutions. It is especially suitable for hardening, brazing and soldering small parts of either ferrous or non-ferrous metals.

Complete unit with line connection and load coil.

$870.
f.o.b. factory

WILL HEAT TO 1500° F.

⅛"	steel	rod	1"	length	in	approx.	1 second
¼"	"	"	"	"	"	"	3 seconds
½"	"	"	"	"	"	"	15 seconds
1"	"	"	"	"	"	"	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes.
Equally well suited for heating of non-ferrous metals.

LEPEL HIGH FREQUENCY LABORATORIES, INC.
55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

WRITE FOR LEPEL CATALOG ST-5

and then to actually practice by playing roles, opportunity is given to make mistakes and then to correct them.

Although techniques may change, the basic principles seem to have considerable permanence. Mr. Allen says, "'Training that is to pay off must be accepted by the supervisor as part of his job responsibilities . . . the importance of the individual should never become secondary to the group in training, for effective group action must spring from effective individuals."

Isotopes: A Five-Year Summary

Full report on isotope distribution for five years shows more than 10,000 radioactive and 2000 stable isotopes have been distributed to U. S. users. Another 750 radioactive types have been sent to users outside this country. The report is released by the Atomic Energy Commission to summarize growth of the isotope program and provide a source for names of users and titles to 1400 technical papers published on the work in the past two years.

"Isotopes—A Five-Year Summary of U. S. Distribution," is available for $1 from Superintendent of Documents, Government Printing Office, Washington 25. A summary of applications considered significant to industry is printed separately as document TID-5078 and should be ordered from Office of Technical Services, Department of Commerce, Washington 25, for 30 cents.

New Neoprene Sheds More Oil

Baldwin Belting Co. Inc., New York, reports a Neoprene synthetic rubber belting more resistant to vegetable oils than anything previously available. The company worked with DuPont rubber chemists to solve a problem that was raised when a customer discovered serious damage caused by the oils.

Product is a crystallization-resistant polymer of the type W family. It is said to retain desirable properties of the Neoprene formerly used, but exhibit better crystallization resistance and display a lower compression set over a wider range of temperatures. It contains no sulphur, thiuram di-

"My Choice? READY-POWER DRIVE ...Every Time!"

Ready-Power Drive is full electric drive featuring simple handling and full control, but with no limit to the hours of operation at peak efficiency. No wonder operators on incentive jobs prefer Ready-Power equipped trucks . . . they get more work done with less effort!

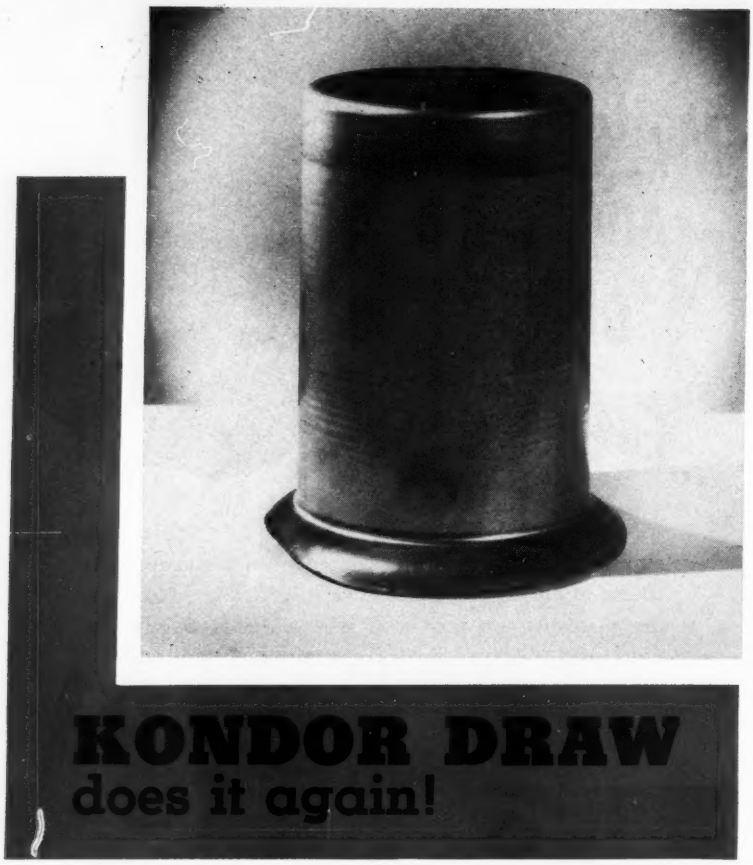
CONTINUOUS-DUTY POWER UNITS

Remember...Your Truck Is No Better Than Its Power!

The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks



The object above is 6″ deep, 4″ in diameter, and was drawn from .078 steel. KONDOR DRAW made this deep draw possible without breakage, scratching or galling. KONDOR DRAW is equally effective on ferrous and nonferrous metals. Its use permits pressure reductions and results in longer die life. Steel formerly rejected as unsuitable for deep drawing can now be used, giving KONDOR DRAW an appeal from the economy standpoint. Ask for a generous FREE SAMPLE. You will find that it is clean, white, pleasant to use and is noninjurious to workmen. KONDOR DRAW's benefits are so startling that only by actual tests can these facts be appreciated. Send your name and title on your firm's letterhead for your free sample, or call in a KONDOR engineer, who will be glad to go over your metal drawing problems with you.

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INDUSTRIAL PROCESSING CHEMICALS
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Offices and Representatives in Principal Cities in the United States and Canada

sulphide or other compounds capable of decomposition to yield either free sulphur or a vulcanization accelerator.

Army Will Field-Check Gages

Gage checking on the job is a service to be inaugurated soon by Army Ordnance for many contractors who do not have their own checking facilities. A mobile gage laboratory was developed by Detroit Arsenal to avoid time lost by taking equipment out of plants for periodic inspection at the ordnance district testing center. Shown for the first time at American Ordnance Association's gage subcommittee meeting recently at West Point, it will tour ordnance contractor plants in southern Michigan and Canada.

Primary function is surveillance gage checking, not original dimensional acceptance. Ketels Mfg. Co., Detroit, built the unit to ordnance specifications. Among major pieces of equipment installed is the Kodak contour projector model II-A, made for checking screw threads, contour gage profiles, pin gages and linear and angular tool dimensions.

Reflectance Test Book Revised

Porcelain Enamel Institute has completed a revision of its recommended reflectance test standards for opaque white porcelain enamels. Prepared by the institute's quality development committee, the bulletin covers apparatus, standards and procedure, and includes a diagram showing interrelation of reflectance, reflectivity and opacity. Tests for both wet-process and dry-process porcelain enamels are described.

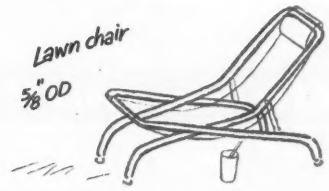
Copies of PEI bulletin T-13 may be obtained for 25 cents by writing to the institute, 1010 Vermont Ave. NW, Washington 5.

Clarification for Shell Molders

Widespread development of the shell-mold casting process since World War II has resulted in many technical advances, but created a complicated patent situation. Report issued by Office of Technical Services brings up to date both the technical and patent phases of

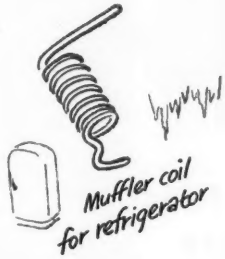
Bundyweld "Doodles"

to jog a designer's imagination



Put Bundyweld Tubing into that part of yours and get improved performance. Put Bundyweld through your production lines and get lowered fabrication costs.

If you need design or fabrication help, depend on Bundy skills, the industry's finest, to save you time, materials, money. If you choose, have Bundy fabricate and ship your parts—in any quantity and on time. Write for catalog today. ***Bundy Tubing Company, Detroit 14, Michigan.***



Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

Leakproof
High thermal conductivity
High bursting point
High endurance limit
Extra-strong
Shock-resistant
Ductile

Lightweight
Machines easily
Takes plastic coating
Scale-free
Bright and clean
No inside bead
Uniform I.D., O.D.

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

passed through a furnace. Copper coating fuses with steel. Presto . . .

Bundyweld, double-walled and brazed through 360° of wall contact.

← **NOTE** the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: *Cambridge, 42, Mass.:* Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave. South ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 881 Bay St. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

this process for producing precision metal castings.

Topics discussed in the report include quality of the cast metal product, relation of methods to other industrial processes, technical methods, dimensional accuracy and surface smoothing, metals and casting size limitations and present status of the process. One section summarizes patent developments in Germany and the U. S. A reference chapter offers an extensive bibliography listing descriptive literature, U. S. and German patents and available reports on German shell-mold casting technology.

The 13-page publication sells for 25 cents a copy and should be ordered from Office of Technical Services, U. S. Department of Commerce, Washington 25.

Gear Quality Clarified

Clarification of data required to specify and test spur and helical gears is offered in "A Practical Approach to Gear Quality," published by Eastman Kodak Co. Paper outlines the minimum information necessary to follow the set of standards determined by American Gear Manufacturers Association and American Standards Association.

Some of the subjects covered are specifications for gears, a definition of the class concept, and discussion of backlash, analytical errors and active versus inactive profiles. Paper is illustrated by charts and diagrams to help explain the principle involved. Copies are available from the company at Rochester 4, N. Y.

Rotary Unit Speeds Chip Drying

Reclamation of aluminum chips and machine tool cuttings is said to be greatly speeded by rotary drying techniques as employed by several West Coast waste metal reclamation firms. The rotary dryer is 5 feet in diameter, 30 feet long, and has a double-shell construction to stabilize mounting and permit simplified replacement of the inner liner shell.

Ordinarily, aluminum chips are reclaimed by washing in hot detergent and drying by draining and air currents. In the rotary dryer method, aluminum cuttings are fed directly into the dryer, into a temperature of about 1000° F. Residue of grease and coolant compound on the metal is evaporated or partly burned by the combined action of high temperature and contact with the burner flame.

Dryer used for this purpose is made by Standard Steel Corp., Los Angeles, a direct fired, countercurrent type ordinarily fired by gas. The company says this rotary dryer technique can be used to advantage in speeding reclamation of expensive alloy cuttings. They add that several firms are lowering reclamation costs by the rotary dryer direct-flame method.

Cab Windows Are Protective

Cab windows of Harnischfeger cranes and excavators are being glazed for maximum clarity and safety with cast plastic sheets, the product of Cast Optics Corp., Riverside, Conn.

According to the manufacturer, the windows are as clear as plate glass, their light transmission fac-

Good for many years at hard labor
YORK·GILLESPIE
CUSTOM-BUILT MACHINERY
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Steel Mills • Steel Fabricators
Industrial Manufacturers
Now is the time to modernize your industrial machinery. For never before has American industry encountered such a challenge! Its double job of producing for defense and civilian needs demands plant machinery built stronger, to last longer.
York-Gillespie Manufacturing Company — designers and custom-builders of special machinery — and York Engineering and Construction Company form an unbeatable team working to develop and build machinery to fit your production requirements.
From Your Own Blueprint or Our Design
Special machinery is created in our shops from your own design . . . or we will design and fabricate to solve your specific problem.
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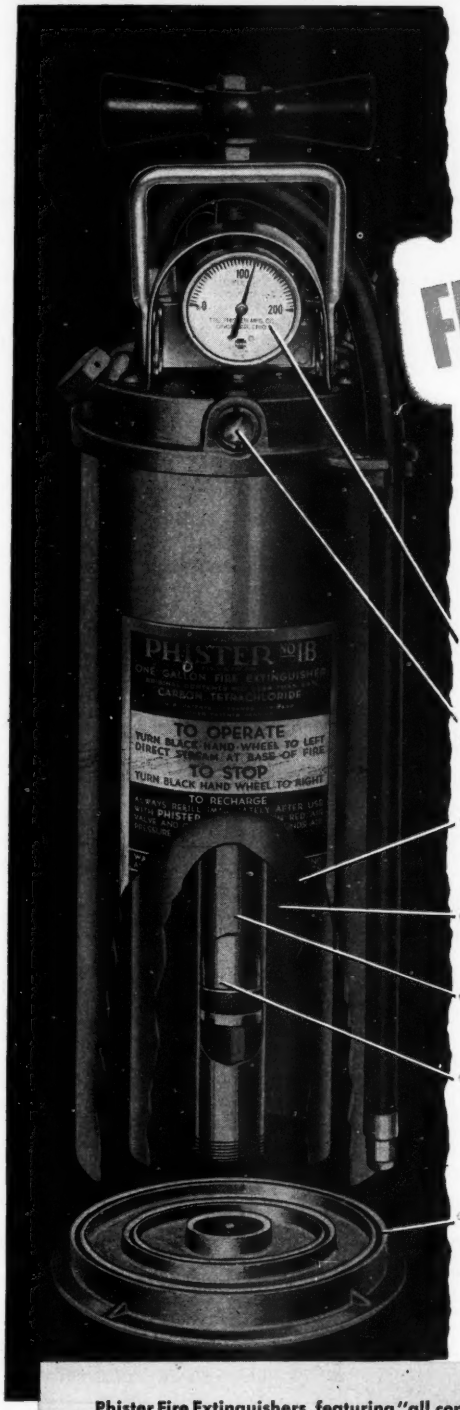
951 Penn Avenue, Pittsburgh 22, Pa.


PHISTER No 18
ONE GALLON FIRE EXTINGUISHER
CARBON TETRACHLORIDE
TO OPERATE
TURN BLACK HAND WHEEL TO LEFT
DIRECT STREAM AT BASE OF FIRE
TO STOP
TURN BLACK HAND WHEEL TO RIGHT
TO RECHARGE
AIR PRESSURE GAGE
LIQUID LEVEL INDICATOR
LIQUID CHAMBER OUTER SHELL 6" O.D. x .050" SEAMLESS COPPER TUBE
COMPRESSED AIR CHAMBER
SEAMLESS COPPER TUBE PUMP CASING
SEAMLESS BRASS TUBE HAND PUMP (FOR RECHARGING; AIR-LINE CONNECTION IS IN BONNET)
CAST RED BRASS BASE AND BONNET (TUBE GROOVES ARE MACHINED)

Phister Fire Extinguishers, featuring "all copper and brass construction," are made in a variety of portable sizes and are readily recharged after use. Copper and copper-alloy components provide high resistance to corrosion. Other Anaconda Alloys are used for valve parts, packing nuts, couplings, bushings, gage guards, hose clips, pump parts, etc.

"BUILT-IN" FIRE-FIGHTING POWER *that lasts*

In the home or plant, the cry of "fire" is always frightening, and infinitely more so if the extinguisher fails to work.

Based on several such experiences, and goaded by the conviction that "any fire costs more than a dependable fire extinguisher," founders of The Phister Manufacturing Company of Cincinnati, way back in 1918, decided to design an extinguisher "superior to any on the market" and combining these four *musts:*

1. It must maintain constant air pressure—without pumping.
2. It must be ready to go into operation instantly . . . even after years of disuse.
3. Air pressure and liquid level gages must indicate condition at a glance.
4. Most important, dependable, corrosion-resistant metals must be used to eliminate the most common cause of failures.

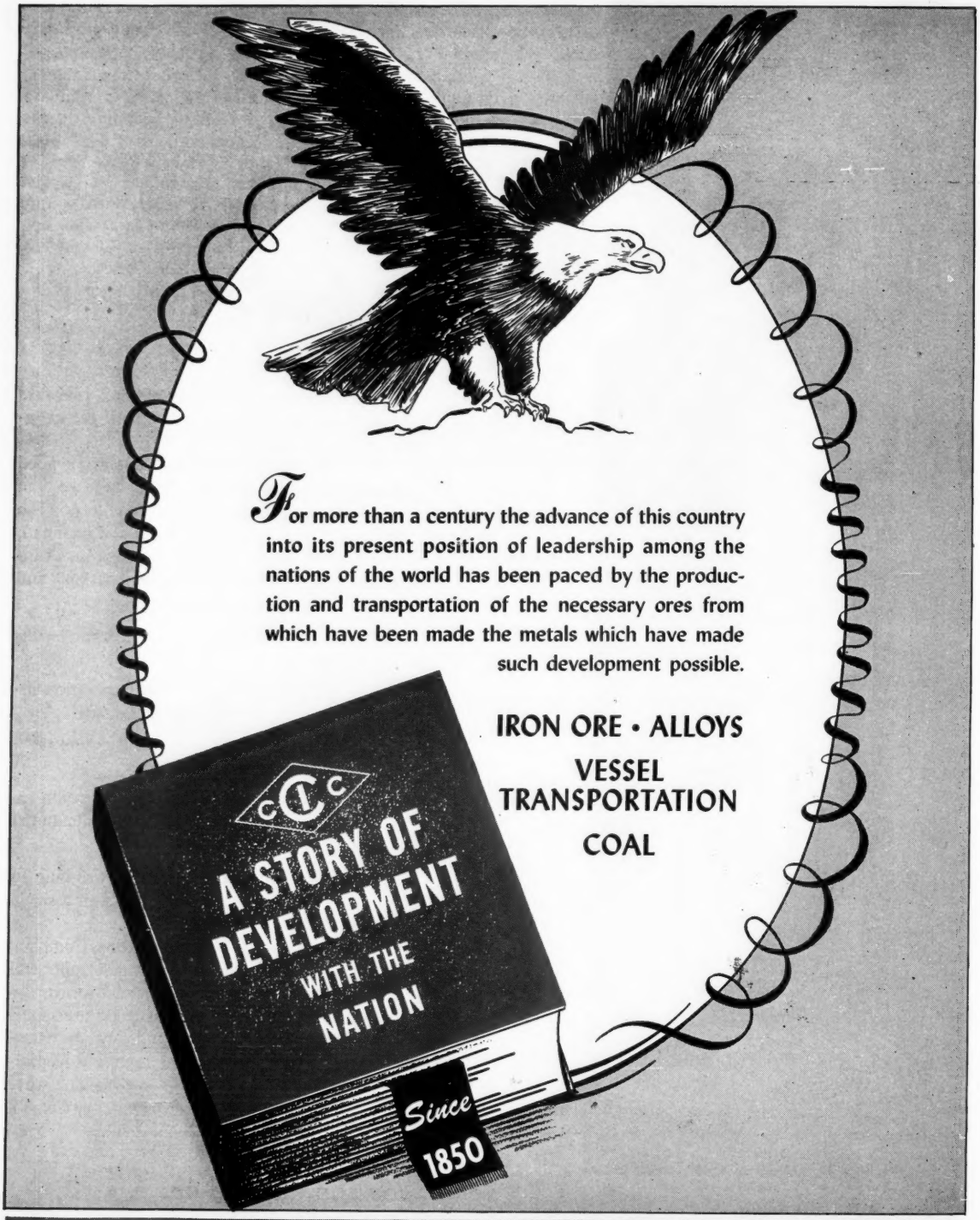
Since the first Phister Extinguisher was built to these specifications, there has not been a single record of failure by corrosion.

Over the years, The American Brass Company has supplied Phister with Anaconda Copper and Copper Alloys in many commercial forms, filling precise requirements of corrosion resistance, close-tolerance dimensions and low-cost fabricating qualities. Perhaps our Technical Department could work with you in a similar way? Write The American Brass Company, General Offices, Waterbury 20, Connecticut. 8291

You can depend on

ANACONDA

COPPER & COPPER ALLOYS


For more than a century the advance of this country into its present position of leadership among the nations of the world has been paced by the production and transportation of the necessary ores from which have been made the metals which have made such development possible.
IRON ORE • ALLOYS
VESSEL TRANSPORTATION
COAL
CCC
A STORY OF DEVELOPMENT WITH THE NATION
Since 1850
THE Cleveland-Cliffs IRON COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

tor being 92 per cent. Clear vision for the operator is further assured by complete resistance of the plastic material to both mechanical and chemical crazing. Safety of the operator is made doubly sure by the high resistance of the sheets to impact, chemical action and the spatter of molten metals.

End Roll Cuts Bearing Wear

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., announces a roller bearing end roll with features designed for flexibility, ease of adjustment and a minimum amount of maintenance work. Flexibility is achieved through the totally enclosed bearing housing. This is locked to the end of the roll, but can be changed in a few minutes from one roll to another. Or it may be left in place on the roll during dressing, and thus need be changed only when the roll is discarded.

Bearing housing is held securely by heavy C clamps without point contact between housing and clamp. Instead, a self-aligning surface contact permits vertical adjustment without wearing the clamping surface. Vertical adjustment may be made freely without disturbing the axial adjustment, which is obtained

Automatic Loading

Visitors at the Industrial Finishing Exposition in Chicago will see this Stevens plating and processing machine operate with automatic loading feature. Here steel shot is copper plated in a machine that uses both the new loading feature and the already built-in unloader to modernize handling

T-W HAS the DOPE on ORDNANCE

This double roll Seam Welder welds Base Plates to Projectiles. With slight modification, the welder can weld base plates to six sizes of projectiles from 75 MM to 8".

● Save days of engineering and planning—the information you need is in the T-W files. Bring your contract problems to T-W—take advantage of previous experience and collected data. T-W men can help you with your bid; show you how to approach the job; how to install the equipment and how to produce the parts. The listing at right shows a few of the items which T-W customers are producing on T-W welders. Call on Taylor-Winfield and the men who know from experience how to handle specifications covering ordnance items.

Write, wire or phone Taylor-Winfield.

A Few of the Products Made on T-W Welders

BASE PLATES ON PROJECTILES

AMMUNITION BOXES

BAZOOKA FIN ASSEMBLIES

60 AND 81 MM TRENCH MORTAR FIN ASSEMBLIES

SHELL CONTAINERS

PRACTICE AND LIVE AERIAL BOMB FIN ASSEMBLIES

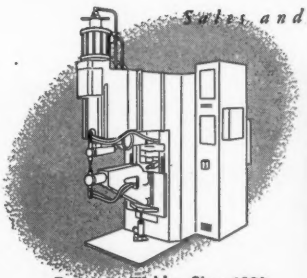
GRENADES, GRENADE LAUNCHERS

ARMOR PIERCING SHELL ASSEMBLIES

COMBAT HELMETS

BAZOOKA COMPONENTS

Sales and Service In All Principal Cities

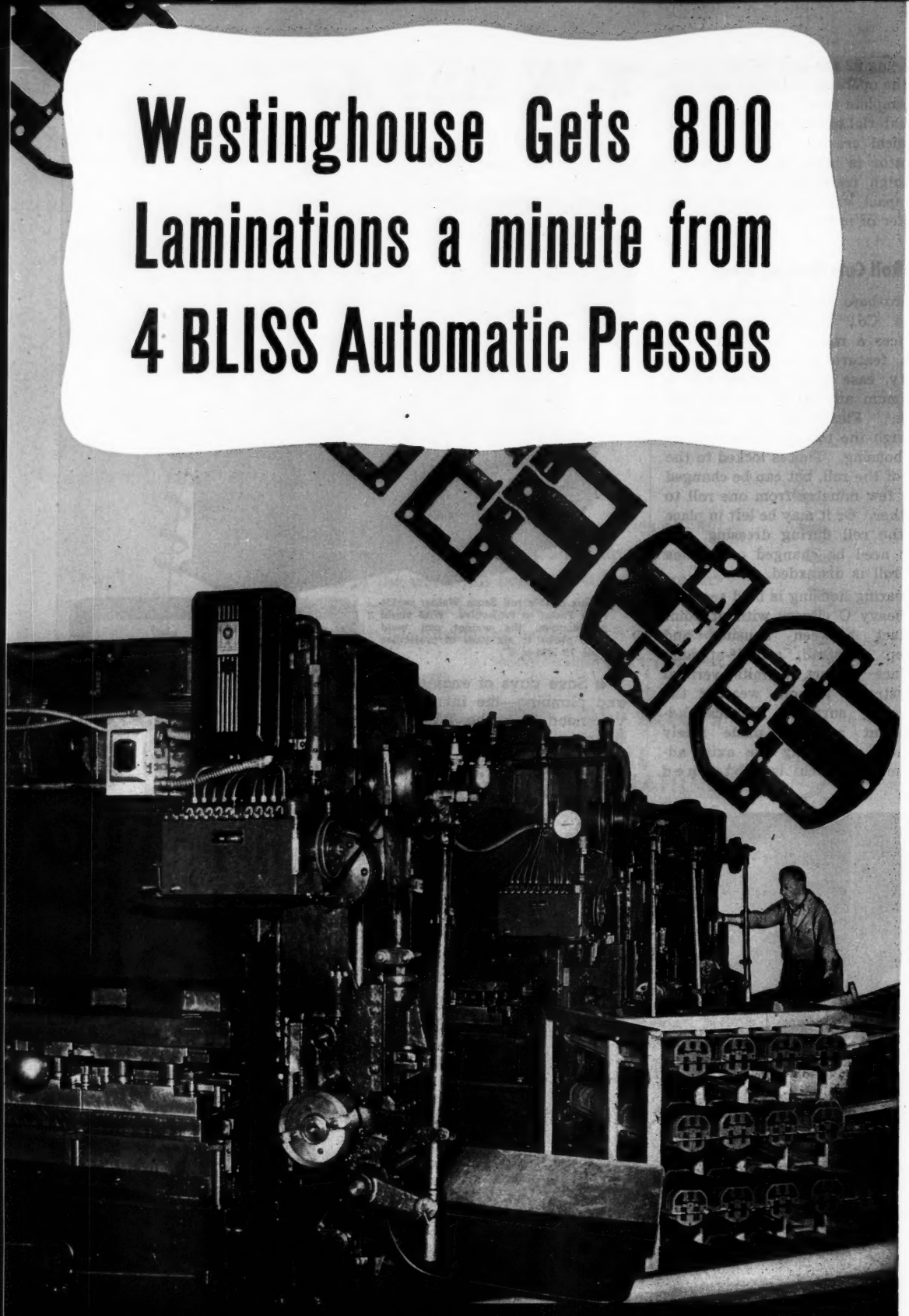


Resistance Welders Since 1883

TAYLOR-WINFIELD
RESISTANCE WELDERS

THE TAYLOR-WINFIELD COMPANY ● WARREN, OHIO

Westinghouse Gets 800 Laminations a minute from 4 BLISS Automatic Presses



Bliss Automatic Lamination line of four No. 645 High-Production Presses, operating at speeds in excess of 200 strokes per minute, produces meter laminations at the Westinghouse, Newark, N. J., plant.

Meter Division at Newark operates battery through two shifts daily

To keep pace with stepped-up meter production, Westinghouse relies on a battery of four Bliss High-Production Presses for a major portion of its lamination stampings.

Production is fully automatic: 0.017 in. silicon steel feeds from a Bliss-built coil cradle, through a double-roll feed, into the Westinghouse-designed six-station die. Stamped laminations stack into a magazine; scrap is pulled through and automatically trimmed...all at a continuous day-in, day-out operating rate of 200 spm.

The first of these four Bliss No. 645 Presses was installed in 1929; the newest has been on the job less than a year. These are but four of 80 Bliss presses on the job at the Westinghouse Meter Division.

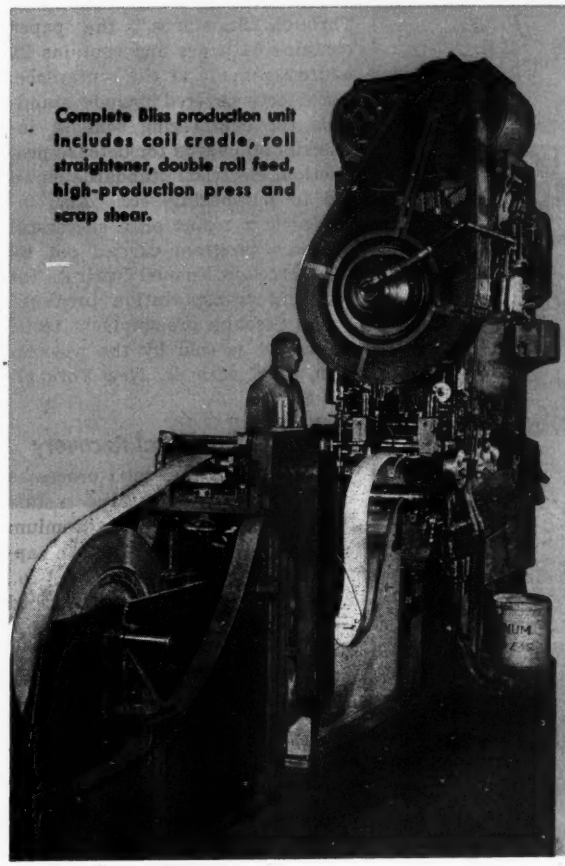
When you consult Bliss engineers, you will find Bliss has the right press for almost every metal-forming operation. That's because Bliss builds the most complete range of pressed-metal machinery available anywhere. To see how Bliss experience has worked for industry, write for "The Dominant Factor," our 32-page brochure.

E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

Presses, Rolling Mills, Special Machinery



Complete Bliss production unit includes coil cradle, roll straightener, double roll feed, high-production press and scrap shear.

Check these features:

- Crankshaft with oversize crankpins supported in heavy box-type crown
- Frame of high-tensile, fine-grained Meehanite with heavy sections minimizing deflection
- Slide guided in bronze-lined square gibs throughout entire stroke and adjustment. Gibs aligned to extremely close tolerances for very accurate slide guidance
- Rolls and feed adjustments built in for precision feeding
- Compact design for high-speed operation
- Die area easily accessible from both front and rear of press for ease in setting complicated multiple-station dies.

Write for your copy of "The Dominant Factor in Pressed Metal Production". It contains interesting case histories of Bliss presses at work throughout industry.

From a single press for a given job...to a complete press room... ***It's Bliss!***

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AL
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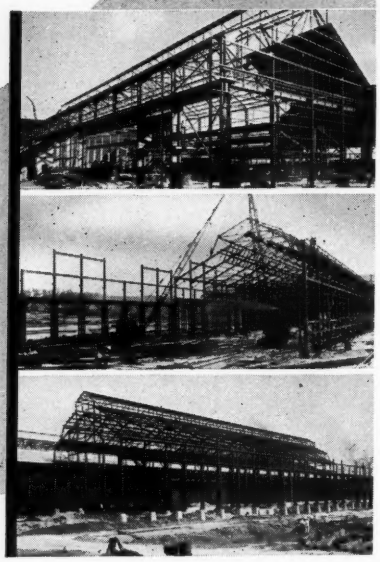
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Member American Institute of Steel Construction
GENERAL OFFICES: PITTSBURGH, PA.
"Steel Permits Streamlining Construction with Safety, Endurance and Economy"
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through heavy adjusting nuts, graduated in 0.001-inch.

Absence of point contact between clamps and bearing housing helps prevent wear of the clamping point and indentation of the clamping surfaces. Further, the clamping surfaces can be set freely and locked, eliminating the resurfacing and grinding operation required with conventional locking devices to maintain clamping clearance. This holds maintenance at a minimum. Patented tilting cap over the roll can be lifted to effect roll changes through the top of the housing without disassembling the end roll adjustment, and with no loss in housing rigidity.

Report Includes Standards

Proceedings of the three-day Second National Standardization Conference, are published by the American Standards Association. Titled "Strengthening America Through Standards," the paper contains 64 pages and contains 21 addresses made at the conference.

Subjects covered include standards for engineering schools, industrial standards for defense production, electrical standards as an aid to purchasing, etc. Also included is a report on a successful research program carried out by the Porcelain Enamel Institute for reducing transportation breakage losses through pre-shipment tests.

Booklet is sold by the association, 70 E. 45th St., New York 17, for $1.

Resins Further Metal Recovery

Success of commercial processes in recovering such scarce metals as copper, tin, zinc and chromium is reported by C. F. Paulson, application engineer, Permutit Co., New York. Mr. Paulson described these processes in a paper, "Metal Recovery by Ion Exchange," presented recently to the American Electroplaters' Society in Chicago.

The speaker says commercial application results from development of high-capacity cation and anion ion exchange resins. These are resins that were used previously for water softening installations, but which now recover metals in greater quantities and at faster rates than was possible under earlier methods.

Applications proving successful

1. GENERAL MANAGER, 2. AUDITOR, 3. PROJECT ENGINEER, 4. RESEARCH ENGINEER, 5. PROCUREMENT ENGINEER, 6. MANAGER OF CONSTRUCTION, 7. PERSONNEL MANAGER, 8. PLANNING AND SCHEDULING ENGINEER, 9. SALES MANAGER.

In the BIG LEAGUES it's TEAM-WORK that counts

Although the stars on the Chemical Plant's team are not publicized, the roster is made up of engineers and other specialists having outstanding performance records. Chemical Plants Division is staffed to "take over" tentative plans and see the job through to completion with competence, speed and economy. Whether the project calls for a packaged gasoline plant, an addition to your present facilities or the construction of a complete process plant ready for operation, Chemical Plants is interested in playing ball with you.

CHEMICAL PLANTS DIVISION

BLAW-KNOX CONSTRUCTION COMPANY

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include recovery of zinc in rayon plant waste, recovering tin as sodium tannate in tin-plating alkaline baths and recovering copper, chromium, and chromic acid used in such processes as electroplating, anodizing, copper stripping and brightening after electroplating. Soon to come, Mr. Paulson predicts, is commercial recovery of the precious metals, gold and silver, from ore and plating solutions.

Cathode Alloy Announced

Development of the first of its new high-performance Cathaloy series is announced by the Superior Tube Co., Norristown, Pa. The new cathode alloy is designated as Cathaloy A-30. It contains about 0.1-per cent aluminum as the principal reducing agent for the coating. Otherwise, it is similar in purity and in residual elements to other specially melted cathode alloys now available.

High performance properties claimed for the cathode alloy are: Rapid cathode activation; high electron emission; high resistance to leakage between the electrodes of the tube through control of sublimation characteristic; negligible electrical impedance of the interface layer between the cathode coating and the base material; reliable long life with minimum change in electrical characteristics.

Cathode alloy can be supplied to the dimensions and tolerances that are in standard use throughout the industry. It is amenable to severe mechanical forming and not unduly sensitive to embrittlement and similar troubles.

The new Cathaloy series will consist of both active and passive alloys. They will be available in both seamless and lock seam types and in the diameters and lengths normally required by electron manufacturers.

Heat Resistance Check Improved

Automatic method for measuring flame resistance qualities of sound conditioning materials is announced by Armour Research Foundation of Illinois Institute of Technology. Technique used in the flame resistance analysis meets requirements of National Bureau of Standards, says Luther G. Ramer, supervisor of the foundation's Riverbank Acoustical Laboratories. Work was done for Acoustical Materials Association to secure data for future manufacturing standards.

Technique consists of regulating humidity in samples, then arranging the material on a fireproof framework over an automatically controlled gas flame. Temperature is increased through control equipment, held for a predetermined period, then decreased—all automatically. Permanent record of temperatures to which various types of acoustical materials are subjected is also maintained automatically. After the flame test, samples are removed and photographed.

Equipment used in the improved method is being retained at the Riverbank laboratories. It will be used there on a continuing basis for determining flame resistance of samples submitted by member companies of Acoustical Materials Association.

CALENDAR
OF MEETINGS

May 19-20, American Steel Warehouse Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 442 Terminal Tower, Cleveland 13. President: Walter S. Doxsey.

May 19-21, National Industrial Distributors Association: Annual meeting, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia 3. Secretary: H. R. Rinehart.

May 19-21, American Supply & Machinery Manufacturers Association: Annual convention and conference booth activity, Hotel Traymore, Atlantic City, N. J. Association address: 731-732 DuPont Circle Bldg., Washington. General manager: R. Kennedy Hansen.

May 20-21, Nuclear Energy Conference: Michigan State College, E. Lansing, Mich. Program chairman: D. J. Renwick, Mechanical Engineering Dept.

May 21-22, American Iron & Steel Institute: Annual meeting, Waldorf - Astoria Hotel, New York. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

May 21-23, Gas Appliance Manufacturers Association: Spring meeting, The Broadmoor, Colorado Springs, Colo. Association address: 60 E. 42nd St., New York. Secretary: H. Leigh Whitelaw.

May 22-23, American Coal Sales Association: Annual convention, The Homestead, Hot Springs, Va. Association address: 1625 Eye St., Washington 6.

May 22-24, American Society for Quality Control: Annual meeting & exhibit, War Memorial Auditorium, Syracuse, N. Y. Society address: 70 E. 45th St., New York 17. Secretary: Alfred L. Davis.

May 25-28, National Association of Purchasing Agents: Annual international convention & exposition, Convention Hall, Atlantic City, N. J. Association address: 11 Park Place, New York 7. Executive secretary: George Renard.

June 1-6, Society of Automotive Engineers: Summer meeting, Ambassador & Ritz-Carlton Hotels, Atlantic City, N. J. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

June 2-3, Multiple V-Belt Drive & Mechanical Power Transmission Association: Spring meeting, Edgewater Beach Hotel, Chicago. Association address: 7 W. Madison St., Chicago 2. Secretary: Harry P. Dolan.

June 2-4, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

June 2-13, Canadian International Trade Fair, Exhibition Grounds, Toronto.

June 3-6, National District Heating Association: Annual meeting, Skytop Lodge, Skytop, Pa. Association address: 827 N. Euclid Ave., Pittsburgh 6. Secretary-treasurer: John F. Collins.

June 5-7, Electric Metal Makers Guild Inc.: Annual meeting, French Lick Springs Hotel, French Lick, Ind. Guild address: Box 6026, Mt. Washington Station, Pittsburgh. Secretary: C. B. Williams.

June 9-21, International Organization for Standardization: Triennial meeting, Columbia University, New York. Secretary-general: Henri St. Leger, Geneva, Switzerland. Host association: American Standards Association, 70 E. 45th St., New York 17. Secretary: George F. Hussey Jr.

June 13, The Wire Association: Regional meeting, Hotel Biltmore, Los Angeles. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

June 15-18, National Association of Cost Accountants: Annual international cost conference, Waldorf-Astoria Hotel, New York. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

June 15-19, American Society of Mechanical Engineers: Semi-annual meeting, Sheraton-Gibson Hotel, Cincinnati. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

June 16-17, Malleable Founders Society: Annual meeting, The Homestead, Hot Springs, Va. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

June 16-20, American Electroplaters Society: Annual meeting and industrial finishing exposition, Hotel Conrad Hilton and International Amphitheatre, Chicago. Society address: Box 168, Jenkintown, Pa. Secretary: D. Gardner Foulke.

June 17-19, American Management Association: General conference, Waldorf-Astoria Hotel, New York. Association address: 330 W. 42nd St., New York.

June 22-24, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 32 Third Ave., Mineola, N. Y. Secretary: E. A. Schoefer.

June 23-26, Radio-Television Manufacturers Association: Annual convention, Palmer House, Chicago. Association address: 777 14th St. NW, Washington 5. Secretary: James D. Secrest.

June 23-27, American Institute of Electrical Engineers: Summer general meeting, Hotel Nicollet, Minneapolis. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

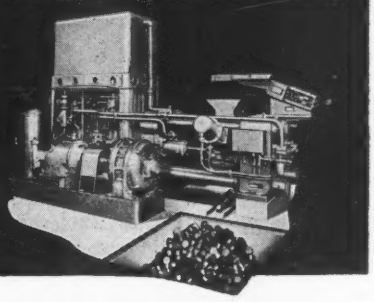
June 23-27, American Society for Testing Materials: 50th anniversary meeting and exhibit, Hotels Statler and New Yorker, New York. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

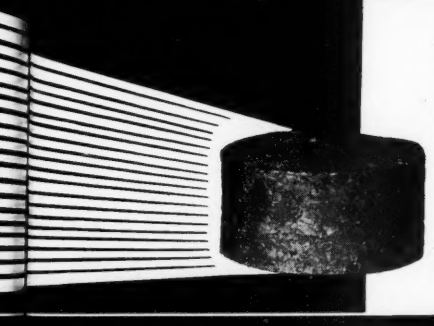
June 23-27, American Society of Mechanical Engineers: Oil & Gas Power Division conference, Hotel Statler, Buffalo, N. Y.

June 29-July 2, National Industrial Advertisers Association: Annual meeting, Palmer House, Chicago. Association address: 1776 Broadway, New York. Executive secretary: Blaine G. Wiley.

June 29-July 2, Caster & Floor Truck Manufacturers Association: Joint material handling, industrial meeting, Grand Hotel, Mackinack Island, Mich. Association address: 7 W. Madison St., Chicago 2.

with a MILWAUKEE BRIQUETTING PRESS





Convert low-grade bulk borings, turnings, chips and shavings into compact high-grade briquettes with the **press that pays for itself!** The MILWAUKEE Briquetting Press effects substantial savings by conserving vital metals, providing close scrap control, and reducing scrap handling and storage costs.

Automatic in operation, the MILWAUKEE Press handles steel, aluminum, cast iron, bronze, magnesium, brass and other metals at rates up to 3½ tons per hour. Briquettes produced can be charged directly into furnace or foundry cupolas. In most plants, savings pay for press in less than one year.

Write today for 8-page illustrated Bulletin No. 117 for complete data on six models available.

Foundry Equipment Division

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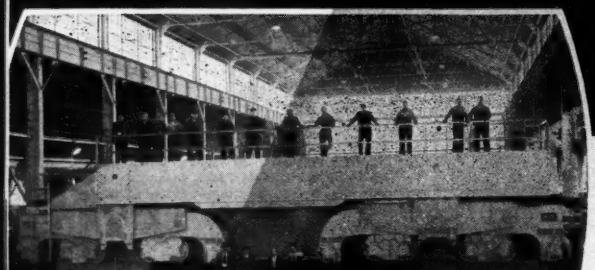

BRIDGE SPAN 76 FEET, OVERALL WIDTH 60 FEET

world's biggest ladle crane gets final inspection . . . . it's 350/60/25 TON ALLIANCE BUILT

● You're looking at two pictures of the world's largest ladle crane, shown, during final assembly, on the erection floor of the Alliance Machine Company.

This 350/60/25-ton, 4-girder, vibration-free giant will soon be helping one of the world's largest steel producers increase production capacity.

It's equipped with 24 track wheels on the bridge. The crane is so designed that each track wheel bears exactly 1/24th of the total load. And, like all Alliance Cranes, built for handling hot metals, raw materials, and finished products, it's safer, easier to operate and many times more efficient.

even bigger model now being built

The never-ending demand for bigger, better lifting power has kept Alliance on a constant path of research and development. For more than 50 years, Alliance has been the world's largest producer of the world's largest cranes.

Now in production are three 450-ton, 4-girder Alliance ladle cranes. These will be the largest ladle cranes ever built.

Let Alliance engineers help you with your heavy material handling problems. Write us today for an early consultation.

THE Alliance MACHINE COMPANY

World's largest builders of world's largest cranes

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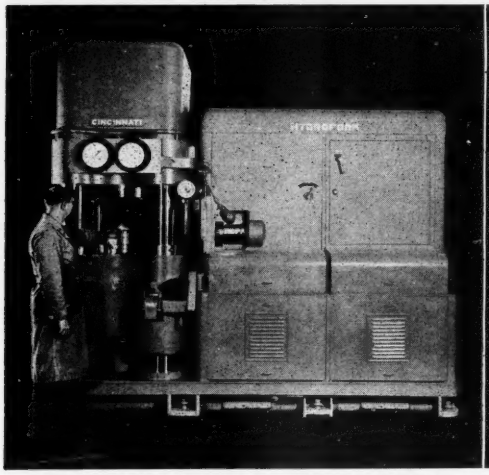
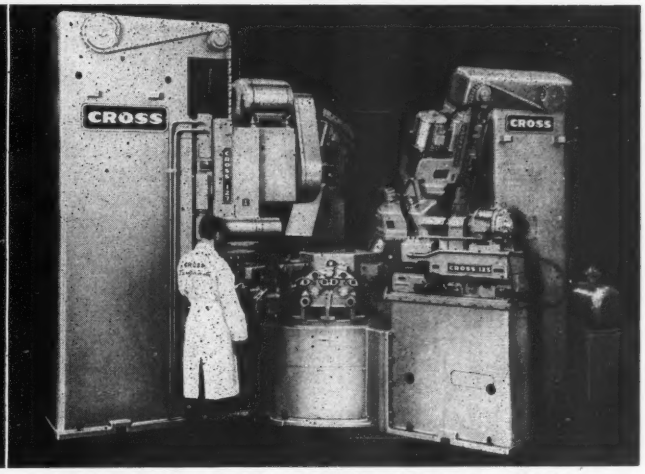
LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

New Products and Equipment



HYDRAULICALLY CONTROLLED FORMING PRINCIPLE
. . . solid punch advances into the pressurized die member



DIAL-TYPE MACHINE WITH HEAVY-DUTY AND ACCURATE INDEX TABLE
. . . works 120 pieces per hour through six stations at 100 per cent efficiency

Metal Forming Line Introduced

USE REPLY CARD—CIRCLE No. 1

Line of metal forming machines made in 12 and 26-inch sizes is introduced by Cincinnati Milling Machine Co., Cincinnati 9, O. Machines operate on the principle of a solid punch member moving into a flexible, hydraulically pressurized die member; or an oil cavity capped with a flexible diaphragm. In operation, flexible die member is lowered and locked, initial pressure is released and punch member moves up into the flexible die member. Stripping is accomplished automatically as the punch is retracted.

Matching die sets are unnecessary. Hydraulically controlled forming principle prevents scarring of formed surface. Hydroform machines have a heavy base in which bolster plate and punch are mounted, a dome containing the flexible die member and four strain rods for containing these units. Automatic unit controls the complete cycle, including increased dome pressure while the piece is forming. Hydraulic system develops maximum pump pressure of 8000 psi, but 15,000 psi can be generated in the flexible die member as the punch moves up during the forming process. Machines can be made in sizes up to 40 inches on special order.

Heavy-Duty Steam Cleaner

USE REPLY CARD—CIRCLE No. 2

Steam cleaning machine for general industrial application is offered by Topper Equipment Co., Matawan, N. J. The heavy-duty machine, called model 120 Circo, has a fully automatic safety-protected system to maintain peak operation and eliminate frequent adjustment. Full operating pressure is generated in about 90 seconds. Burner operates on kerosene, fuel oil and light diesel oil.

Cleaner is available in stationary or portable models of 120-gallon capacity. Balanced swivel-type cleaning gun with gun control shutoff is standard equipment. Full-bearing ½-hp motor powers the unit. Portable model is mounted on a free-rolling carriage with handle designed to return to vertical position when not in use. In latter position, it locks the wheels to prevent movement on inclined surfaces.

REPLY CARDS

on page 161 will bring you more information on any new products and equipment in this section.

Tool Works Exhaust Manifolds

USE REPLY CARD—CIRCLE No. 3

Special tool made to mill, drill, bore, chamfer and tap exhaust manifolds is introduced by Cross Co., Detroit 7, Mich. Dial-type machine employs the company's heavy duty index table, designed to index heavy loads accurately and with minimum downtime. Maintaining 100 per cent efficiency, the machine mills and drills the mounting face; mills, bores, drills and taps the tail pipe pad on 120 pieces per hour. Right or left hand parts can be machined without changing setup.

Six stations are used: One for loading, two for milling, two for drilling and boring, and one for tapping. Preset tools help further reduce downtime and minimize scrap losses during setups. Other features include power indexing, hydraulic feed for milling, drilling and counterboring; individual lead screw feed for tapping; and hardened and ground ways.

Wire Straightening Machine

USE REPLY CARD—CIRCLE No. 4

Machine made for straightening wire from 0.007 to ⅛-inch is offered by Medart Co., 3535 DeKalb St., St. Louis 18, Mo. Called the Minimatic, the machine is fully automatic and entirely self-feeding after operator starts the fine round

wire into the straightener. Two buttons control the straightening process through its entire cycle without further attention.

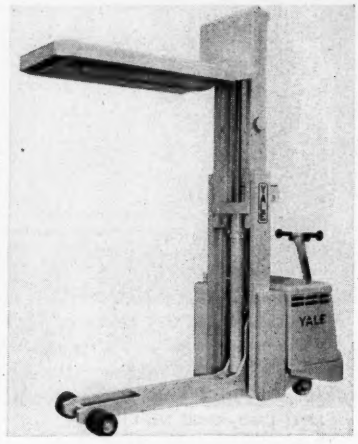
Wire is fed from a spinner reel that rotates laterally in a direction opposite to the rotating movement of straightener dies to pretwist the wire. This pretwisting compensates for opposing rotation of dies to prevent any twist and internal stress in the straightened wire. Feed and cutoff section is at the right of the straightener housing. Friction-type feed pulls wire through the straightening section and delivers it to the cutoff disks.

High-Lift Platform Truck

USE REPLY CARD—CIRCLE No. 5

Powered hand truck, designed for high-stacking skids and skid bins, is available from Philadelphia Division, Yale & Towne Mfg. Co., Philadelphia 15, Pa. Telescopic high-lift platform model, called the Worksaver, has 4000-pound capacity, lowered height of 6½ inches and lifts loads to a maximum 126½ inches. To gain stability and traction, it has an articulated frame that permits continuous floor contact of loads and drive wheels, despite ramps and floor variations.

Hoist pushbutton is located on operator's control handle. Hand or foot-operated lowering control on the front of the battery compartment permits adjustable-speed lowering. Twin hydraulic pumps and motors are used for fast lifting. Hydraulic system includes a relief valve to protect equipment from overload. Brakes are applied and power is off when control handle is in either up or down position.



. . . stacks skids and bins 126½ inches high

Tools Punch Shaped Holes

USE REPLY CARD—CIRCLE No. 6

Wales-Strippit Corp., N. Tonawanda, N. Y., announces its type HS Hydra-Strip hole punching unit for punching round and shaped holes in mild steel to ¾-inch thick. One feature designed for these heavy-duty punches is application of the company's Hydra-Spring, said to provide greatly increased stripping pressure. Spring performance results from using compressibility of special fluids. Loads can be changed by a simple adjustment to increase or decrease the volume of fluid.

Hole punching units are independent, self-contained. All components are built into the holders that keep the round or shaped punches or dies in alignment for the life of the tool. Nothing is at-

UNEXCELLED

MACHINED BRASS
FORGINGS, CASTINGS,
EXTRUSIONS to customer
specifications...For defense
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TOP BRASS ★★★★★★★★★★★

Producers and Suppliers of materiel for: U. S. Army Ordnance • U. S. Navy • U. S. Army Air Corps • Maritime Commission and the following industries: Air Conditioning • Aircraft • Automotive • Beverage • Diesel Engine • Dry Cleaning • Farm Equipment • Gas Appliances • Locomotive • Oil Refining Equipment • Oil Heating Equipment • Plumbing • Refrigeration • Rubber • Spray Equipment • Washing Machine • and others.

DETROIT BRASS & MALLEABLE WORKS
SPECIALTIES DIVISION
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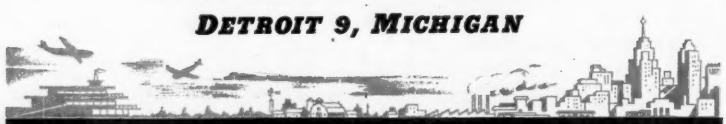
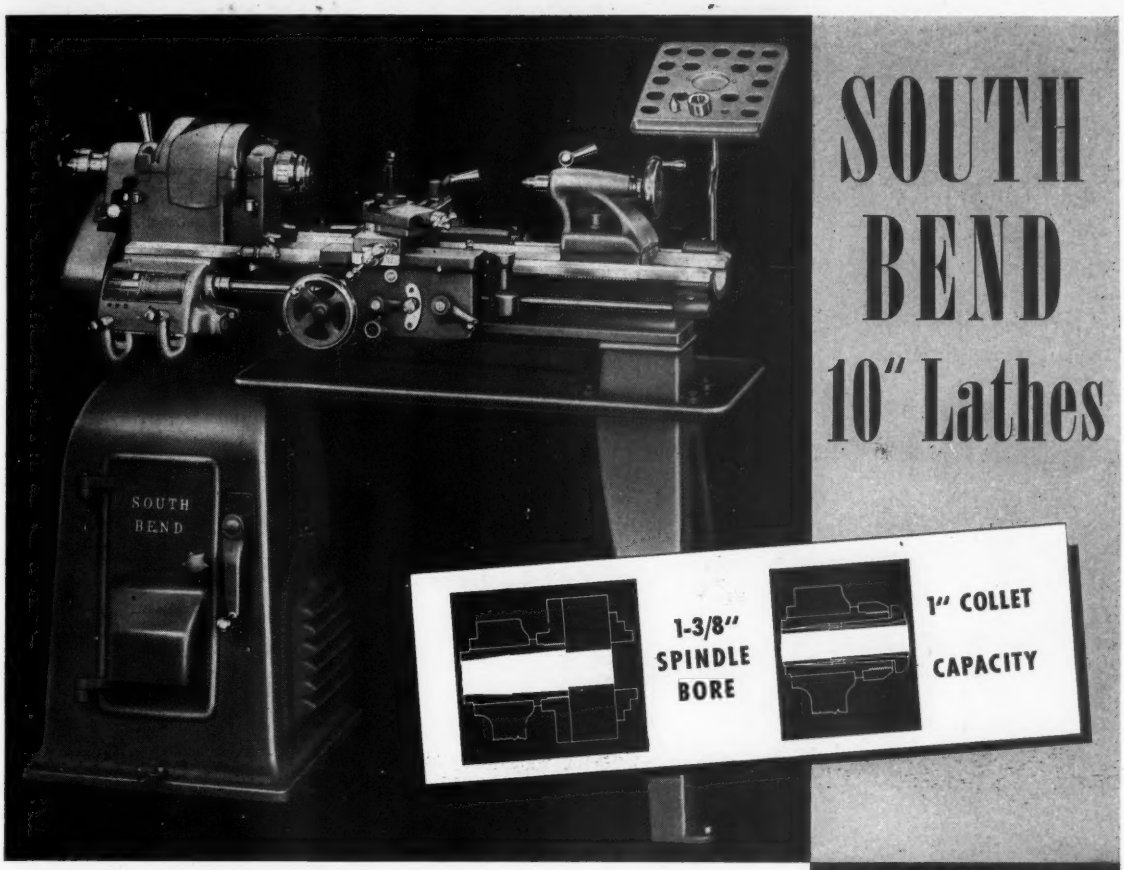


AT YOUR SERVICE IN THE NATIONAL EMERGENCY



SOUTH BEND 10" Lathes

10" *Precision* TOOLROOM LATHE

Sound design, expert workmanship and quality materials give the 10" South Bend Lathe the dependable performance you want. Equipped with a precision lead screw, thread dial indicator and thread cutting stop, you can use it with confidence for cutting screw threads, making precision gauges or turning out instrument parts.

Another outstanding feature is the 1" collet capacity and 1-3/8" spindle bore which is built on the same design and specifications of larger lathes. The large spindle bore gives you big lathe collet capacity in a small, compact unit.

You will like the way this lathe cuts idle time . . . reduces costs . . . releases big lathes for heavy work. Write for catalog *today*.

SPECIFICATIONS

SWING 10⅛" over bed and saddle wings, 5¾" over cross slide.
COLLET CAPACITY . . . . 1 in.
SPINDLE BORE . . . . . 1⅜ in.
BED LENGTHS 3, 3½, 4, 4½ ft.
CENTER DISTANCES . . . 14¾ to 34¾ inches.
SPINDLE SPEEDS (12) 50 to 1357 r.p.m., approximately.
POWER LONGITUDINAL FEEDS 48 R.H. or L.H. . . . .0015" to .0836"
POWER CROSS-FEEDS 48 . . . .0006" to .0309"
THREAD CUTTING 48 R.H. or L.H. pitches, 4 to 224 per inch.
MODELS Quick Change Gear and Toolroom, bench and floor type.

SEND INFORMATION CHECKED:

☐ _____

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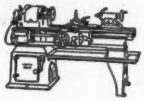
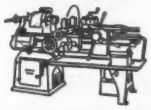
☐ 9" and 10" BENCH LATHES


☐ 10" to 16-24" FLOOR LATHES


☐ ½" and 1" Collet TURRET LATHES

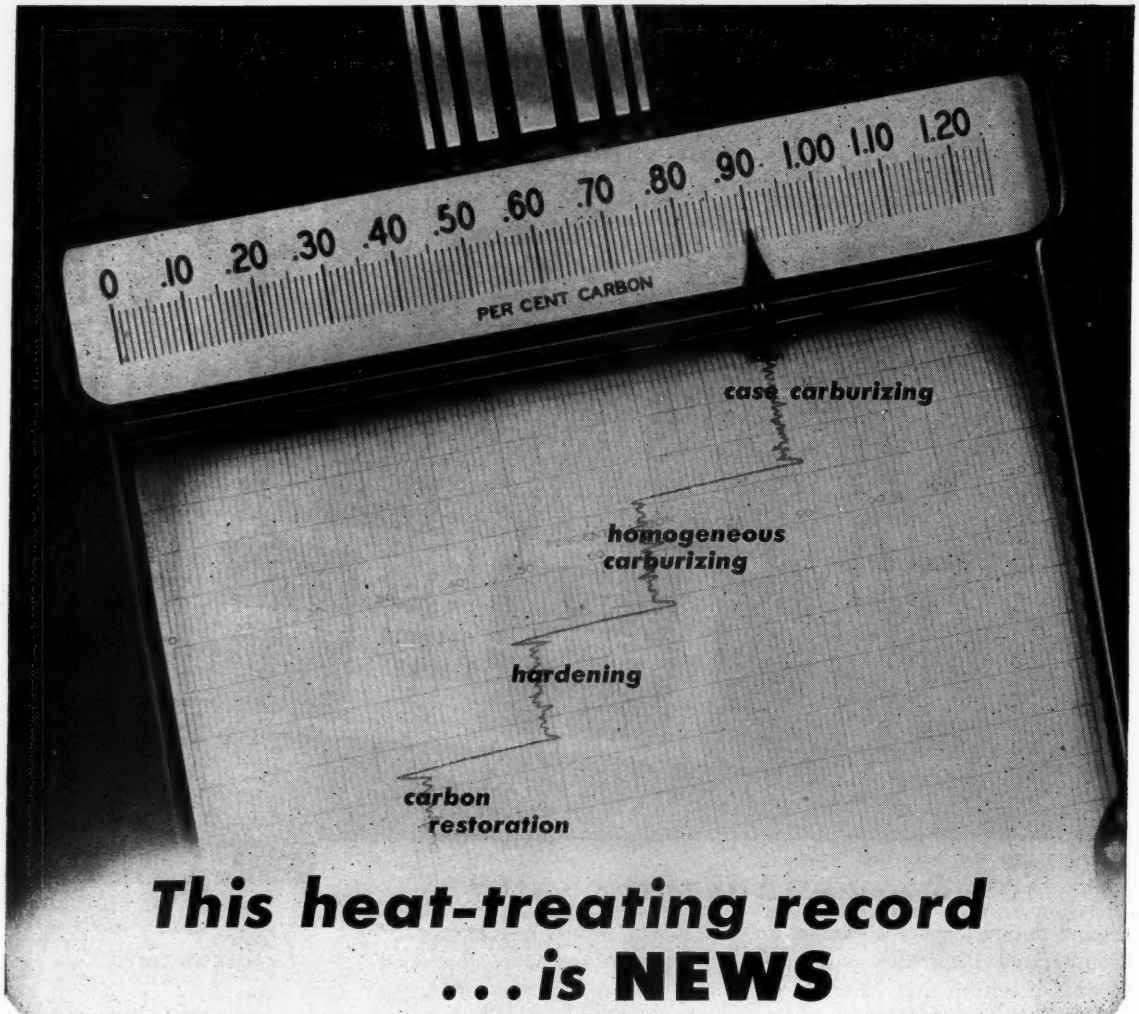
☐ 14" DRILL PRESSES

☐ 7" BENCH SHAPERS

Name_____ Company_____

Street_____ City & State_____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana



This heat-treating record ...is NEWS

The above chart shows a record of surface carbon control during four types of heat-treating processes. During three of these operations carbon is added; during the fourth, it is accurately maintained.

This record, provided by the familiar Micromax Recorder modified for this purpose, is an exclusive feature of the Microcarb method of carbon control as applied to the Homocarb furnace. There is no other way of getting even one of these records, much less all four.

Ninety-nine out of a hundred metallurgists and heat-treaters will find this record is new... something they have never seen before. It tells them exactly what's going on...gives the heat-treater time enough to modify the process or take whatever other action is desirable. It's the NEW way to reduce rejects.

The significance of this new development will, of course, depend upon the plant setup, and must be assessed individually by the metallurgist or heat-treater concerned. However, initial users of Homocarb with Microcarb control are enthusiastic.

One such firm found the results so important to their customers that they featured the story in their own advertising. As more and more manufacturers become familiar with the advantages of Homocarb plus Microcarb, this equipment will soon be more generally known to men who look for the modern way to carburize.

Let us send you further facts about this new development. We may be contacted at our nearest office, or 4957 Stenton Ave., Phila. 44, Penna.

LEEDS & NORTHRUP CO.

INSTRUMENTS • AUTOMATIC CONTROLS • FURNACES

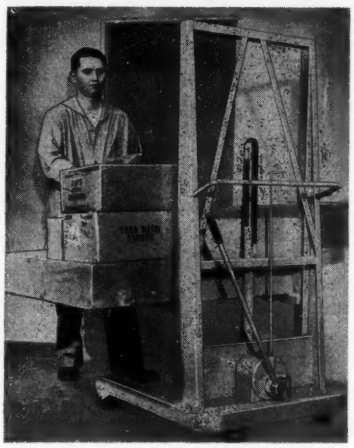
Jr. Ad TD4-623(7)

tached to the press ram; its only function is to depress the punch. The same group of punching units can be set up on templates or T-slotted plates in stamping presses and on rails, strip templates or T-slotted plates in press brakes.

Lightweight Hydraulic Lift

USE REPLY CARD—CIRCLE No. 7

Manually-operated and propelled hydraulic lift with 1000-pound capacity is introduced by Century Products Co., Dept. KP, 5925 Highway 7, Minneapolis 16, Minn. Designed for utility handling, the model weighs 150 pounds, has a



. . . utility tool handles 1000-pound loads

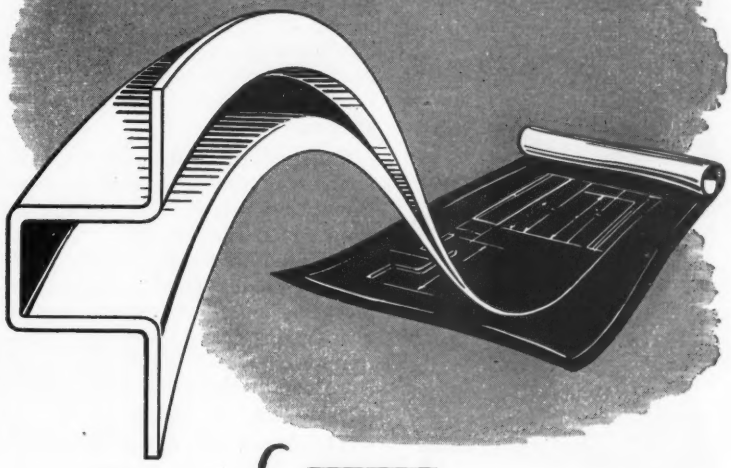
raised height of 4 feet. Lever control releases the platform for controlled descent. Platform is 23 x 24 inches, elevated by a two-cylinder double acting reciprocating pump. Unit has two fixed-position large diameter front wheels and two swivel-type trailing wheels.

Direct Linear Positioner

USE REPLY CARD—CIRCLE No. 8

F. T. Griswold Mfg. Co., Wayne, Pa., provides a precise and simplified optical method of making linear measurements on machine tools. Accurate, direct visual reading is taken without micrometers, loose standards and dial indicators, avoiding inaccuracies due to pressure variations and temperature variations due to handling. Positioner is called the Scan-A-Scale. It consists of two microscopes and two satin chrome finished scales graduated in 0.050-inch. By rotating a dial on the

Now BATH WILL STRETCH-FORM your intricate metal shapes



Any { METAL CROSS-SECTION QUANTITY

Complex metal shapes required by modern aircraft production can be stretch-formed to exacting tolerances. Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings in either full circles or segments can be produced from the new tough alloys developed for jet aircraft.

In addition, Bath stretch-forming technique provides increased strength with reduced weight. Forming single or compound curves, constant or varying radii, and bends of more than 360°, this process produces complex parts in single piece.

Let Bath's 10-years' experience in forming aircraft components aid you in the production of difficult parts. Send blueprints and quantity requirements for free estimate.

504-CY

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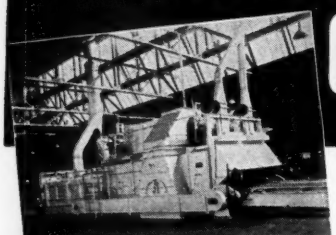
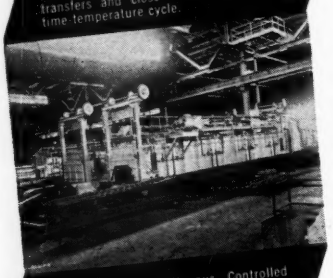
6972 Machinery Avenue • Cleveland 3, Ohio

Guaranteed Results from FURNACES • OVENS • DRYERS

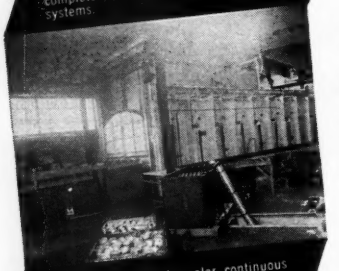
in the OVER-ALL JOB by CONTINENTAL



Continental Twin-Chamber Annealer of the recirculating type with automatic conveyor transfers and close-tolerance control for time-temperature cycle.



Two Continental Continuous Controlled Atmosphere Annealers, roller rail type, complete with transfer cars and conveyor systems.



Continental Stamping Annealer, continuous roller rail type, complete with baskets, handling convevors, and automatic controls for work handling and temperature cycles.

Six Continental "Top Hat" Cover Type Furnaces for bright annealing high-carbon steel, complete with gas generator and automatic controlled time temperature cycling.

for military production...

Whatever your heat process problems in plant conversion for military production, CONTINENTAL has the answer.

CONTINENTAL jobs begin with analysis of the requirements, then the selection and development of proper methods for greatest results. Finally follows the design, the building, and installation of the equipment including necessary work-handling accessories and control devices—delivering a COMPLETE UNITIZED PRODUCING PACKAGE with results guaranteed.

The broad experience of CONTINENTAL offers you a prompt, sure solution to your change-over program.

CONTINENTAL INDUSTRIAL ENGINEERS, INC.
176 W. Adams Street, Chicago 3, Illinois

District Representatives:
Ridgewood, N. J. • Indianapolis • St. Louis • Detroit
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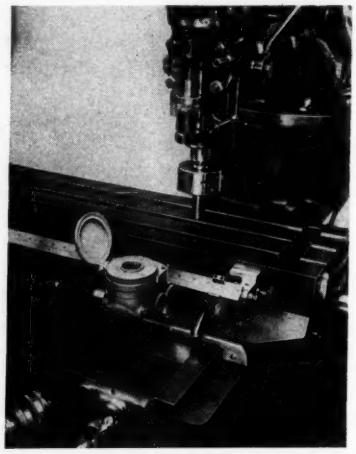
PLANNED MILITARY PRODUCTION
Write for Booklet No. 127

FURNACES
PRODUCTION LINES
CONTINENTAL
SPECIAL MACHINES
COMPLETE PLANTS
MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

microscope, this graduation can be divided to determine readings to four decimals.

Applications include controlling table movement and boring head location on jig borers and boring mills; positioning lathe carriages longitudinally to secure accurate



. . . simplifies optical tool measurement

length settings; and locating milling machine table with respect to the spindle in all of its three planes. Scale can also be used for positioning cylindrical grinding machine tables with relation to the side of the wheel.

Brake Uses No Levels, Linkage

USE REPLY CARD—CIRCLE No. 9

Magnetic brake designed to eliminate levers and linkage found in conventional units is a development of Reuland Electric Co., Alhambra, Calif. Assembly contains six major operating parts and features direct, automatic set and release action between the solenoid and armature. In addition, solenoid is a one-piece doughnut design that permits motor's output shaft to extend completely through the brake. Thus, the user can employ both ends of the motor shaft for powering two pieces of equipment when necessary. This feature also makes brakes suited to fluid coupled motors and gear reducers.

Spring tension automatically compensates for lining wear. Brake torque remains the same, making usual inspection and hand adjustment procedure unnecessary. Brakes are available in 3, 10 and 25-foot-pound continuous duty rat-

Casey's got control over bumps and batters!

Casey's the nemesis of the twilight league—he's got his old stuff back—throws 'em in like the big leaguer the scouts say he could be. "Give the boss credit," quips Casey. "His tire replacement program did it. These MONARCH MONO-CUSHION TIRES pussyfoot over the floors, soak up jolts and jars instead of me. Now, I arrive at the ball park shake-free and sure. Don't forget the company wins, too,—with a champ 'ball club' plus big league savings on truck and floor maintenance."

CUSHION . . . *all the way through*

TOUGH . . . *all the way through*

The leading manufacturers of industrial vehicles, both hand and powered, use Monarch Tires as original equipment. Replacements are available through distributors and manufacturers of your vehicles.

THE MONARCH RUBBER COMPANY

300 LINCOLN PARK • HARTVILLE, OHIO

DETROIT OFFICE, 7-255 GENERAL MOTORS BUILDING

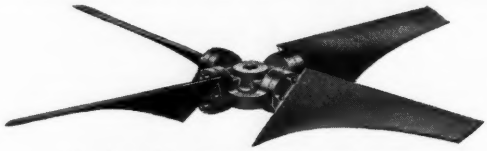
SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

BURT F.E.F. VENTILATORS PROVIDE RAPID REMOVAL OF HEAT, SMOKE, FUMES

For rapid removal of concentrated heat, smoke, dust and fumes, the new Burt Free Exhaust Fan Ventilator offers you remarkable efficiency. Its free opening exhausts an unrestricted column of air vertically upward. Burt's Axial Flow Airfoil Fan, designed specifically for rapid air removal, accelerates the exhaust column at high velocity. Twin dampers open in operation—close automatically when power is off, to thoroughly weatherproof the structure. See Sweet's or write us for Bulletin SPV-18 for complete description of this modern air vitalizer.

Equipped with

BURT AXIAL FLOW AIRFOIL FAN



Aerodynamically designed for the rapid removal of air, the Burt Axial Flow Airfoil Fan is not "just another propeller". It provides a high volume of air delivery efficiently and economically.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

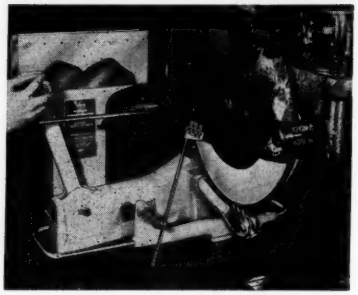
905 So. High St. Akron II, Ohio

ing; 15 and 35-foot-pound intermittent duty types. The one-piece cast housing is dust proof and weather resistant.

Forming Attachment Enlarged

USE REPLY CARD—CIRCLE No. 10

Pratt & Whitney Division, Niles-Bement-Pond Co., W. Hartford 1, Conn., introduces a larger Diaform wheel forming attachment, designed to simplify form-truing of grinding wheels to 20 inches diameter. Attachment is used on medium and heavy-duty, horizontal



. . . simplifies grinding wheel form-truing

spindle surface grinders. It provides a rapid and accurate method of truing a given form up to 3 inches wide and 1 inch deep in one setting. Called model 4, its basic construction is a vertical pantograph, operated by tracing from a 5:1 ratio template to guide a truing diamond across the periphery of the grinding wheel.

Portable attachment weighs about 75 pounds. It is placed on the magnetic chuck or strapped to the table of the grinder. Three diamonds mounted in tandem are used to true a new form on a wheel: One for roughing, one for semifinishing and one for finish truing. Unit is made in both right and left-hand models.

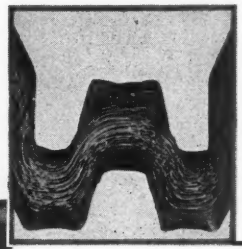
Hydraulic Drum Up-Ender

USE REPLY CARD—CIRCLE No. 11

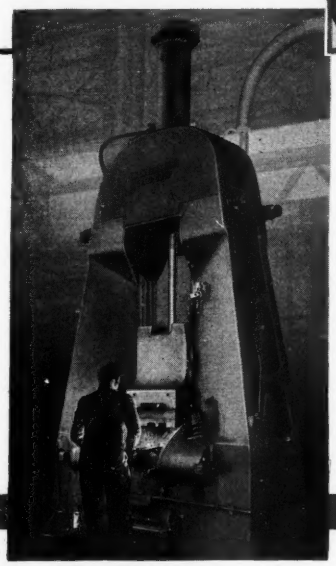
Attachment that permits fork truck operator to pick up, transport, stack and empty heavy drums without leaving his seat is offerred by Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland, O. Drums can be rotated 90 degrees for vertical or horizontal stacking, or tilted 45 degrees below horizontal for emptying at any height within the truck's lift range. Attachment con-

Forging is older than civilization

One of the outstanding characteristics of forged metal parts, as contrasted with metal parts formed by other methods—casting, pressing, welding, etc.—is the movement of the fibres of the metal in following the contours of the part. This is known as "grain flow" and results in placing strength where it is required. The photograph to the right is part of a section of an automobile crankshaft forging etched to show the grain flow, particularly at the "cheeks", which are the load bearing surfaces. →



ARCHEOLOGISTS agree that while true man has been on the earth for from 40,000 to 50,000 years, the age of culture can be dated not earlier than Neolithic man or some 12,000 years ago. And perhaps no longer ago than 6,000 B. C. did civilization which is a combination of the fundamental techniques of domestication of animals, agriculture, horticulture, pottery, brick-making, spinning, weaving and metallurgy, come into existence. Yet the hammer, the first of man's implements (the knife was the second) goes back beyond the age of true man to Neanderthal man who roamed the earth 100,000 years ago.



NO other form of metal working is so ancient, yet so modern as forging. The strength and toughness imparted to hot metal by impact is more essential today than at any previous time in man's history. Unbelievable speeds, terrific stresses and strains, split second changes in temperatures . . . all these make forgings imperative.

Chambersburg hammers have been meeting the constantly more rigorous demands of industry for stronger forgings, tougher forgings, more accurate forgings, in greater quantities, in shorter time . . . for over half-a-century.

CHAMBERSBURG ENGINEERING CO., Chambersburg, Pa.

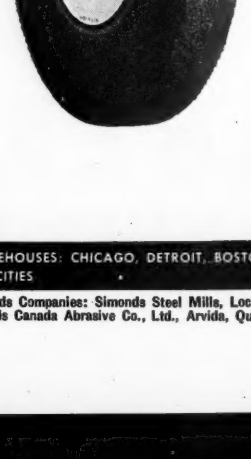
CHAMBERSBURG

THE HAMMER BUILDERS

SIMONDS ABRASIVE CO.

Grinding Wheels

With Simonds Grinding Wheels—in standard shapes and sizes—they're getting in shape for top efficiency from their grinding machines. You'll be getting in shape, too, when you specify Simonds Wheels . . . part of a complete line of grinding wheels, other bonded abrasive products and abrasive grain—all carefully manufactured, thoroughly tested, accurately specified and fully described in our free Grinding Wheel Data Book. Write for your copy today—and the name of your nearest Simonds Abrasive distributor equipped to serve you locally.



SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

sists of shoes pinned to the forks on the carriage. Pivoted rubber-faced grab plates that clamp around the drum to hold it firm are mounted on the shoes. Up-ending operation is done through a hydraulic cylinder mounted on one of the shoes. Clamp and tilt controls are mounted on the dash for operator's convenience.

Attachment is made a part of the company's multi-purpose car-

. . . operator never leaves his seat

riage. This provides standard forks, fork-spacer, automatic adjusting clamp and side-shifter in one unit. Demounting the unit is done by removing two lock pins, unsnapping one hydraulic hose coupling and sliding the up-ender off the forks. Attachment can be mounted on the company's 2000, 3000 and 4000-pound trucks.

Jack Handles Heavy Rigging

USE REPLY CARD—CIRCLE No. 12

Cast and welded hydraulic jack, built for heavy rigging jobs, is announced by Wm. S. Pine, 1635-39 E. 22nd St., Los Angeles 11, Calif. Made of alloy steel, jack capacity is rated at 50 tons and tests at 60 per cent overload. Dual high and low pressure pumps raise ram 10 inches allowing for use of 6 or 8-inch cribbing.

Base is sufficiently large (10 x 12 inches) to minimize damage to cribbing. Use of manganese bronze in the top guide and piston portion that contacts the cylinder prevents scouring. Other important design factors include oil housing and cylinder welded to the cast base to

photograph by d'Arazien

MANPOWER and KNOWLEDGE . . .

two principal ingredients of J&L steel

MEN make steel. No mistake about it, muscle and brains are used a-plenty in the myriad processes from ore to ingot to finished products of Controlled Quality J&L Steel.

In the old days steel was as good or as bad as the iron-master's skill. Now, because improved equipment and technical knowledge have taken out guesswork, you get uniform performance from J&L steel, order after order, day after day. But there's more to steel-making than machines and technical knowledge. And there's more to a man thar muscle and brains.

J&L's management knows that. That's why these J&L supervisors who have come right off their jobs in the mills are meeting.

This particular discussion was not for the purpose of exchanging knowledge about steel, though that is done, too, at the proper times. These men, under the guidance of a skilled conference leader, have come together to learn how to help solve the human problems that come up on the job every day.

It is only one of the groups of J&L men who meet regularly to learn more about economics, human relations, and why the J&L management does things in a particular way.

This sharing of knowledge and experience, understanding, and teamwork among steelmen—is just one of the activities going on behind the J&L trademark, all directed toward one end—better steel for you.

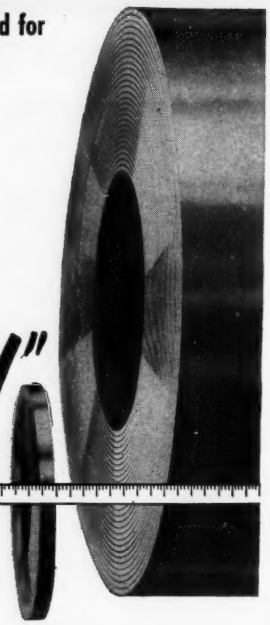
JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

The only plant in the Eastern U.S. equipped for

COIL pickling

From 48" down to 1"



- ROLLER LEVELLING
- EDGE ROLLING • SLITTING
- COIL SHEARING
- SHEET PICKLING—any width, any length, any thickness

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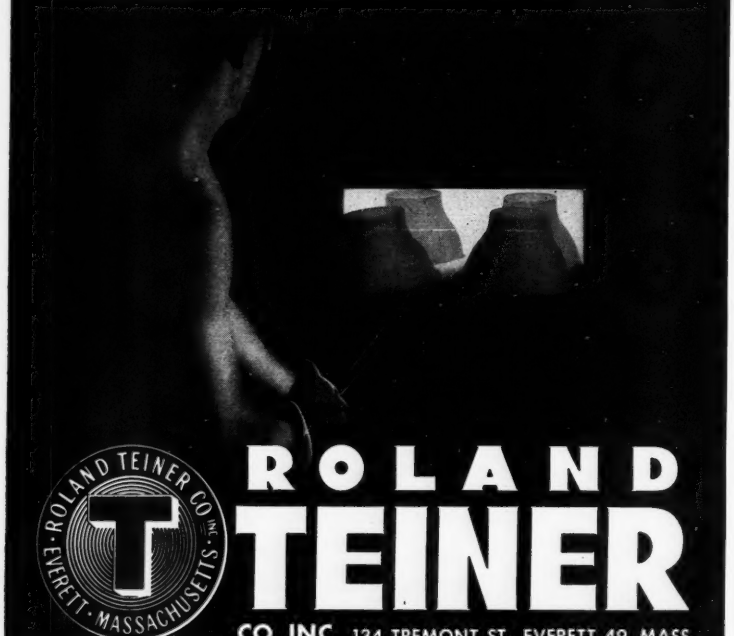
MARSAM CORPORATION

Subsidiary: AMERICAN TOOL & SUPPLY CO.

OFFICE: FRICK BUILDING, PITTSBURGH 22, PA. PLANT: McKEES ROCKS, PA.

FILLING A GOVERNMENT ORDER. Stainless steel jet engine components are heated in annealing oven, prior to re-spinning. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. *Write for newest color brochure* 51-S.



ROLAND TEINER CO. INC. EVERETT MASSACHUSETTS

ROLAND TEINER

CO. INC. 134 TREMONT ST., EVERETT 49, MASS.

help eliminate oil leakage and increase strength. Two lifting handles protect the pump piston from damage.

Barrel Burnishing Compound

USE REPLY CARD—CIRCLE No. 13

No. 0-221 barrel burnishing emulsion, developed by Blue Magic Specialties Co., Philadelphia 24, Pa., mixes with water and has no obnoxious odor. It produces a hand buffed appearance in any metal with any tumbling medium and in any standard barrel finishing equipment suitable for wet tumbling. It can be used repeatedly.

Nonrotating Spindle Head

USE REPLY CARD—CIRCLE No. 14

Reading directly in tenths and by vernier to 0.000025-inch, the micrometer head introduced by Boeckeler Instrument Co., Tucson, Ariz., has a spindle that does not rotate as it is advanced or retracted. It is designed for mounting on mechanical or electronic devices where accurate linear measurement or control is required.

High Speed Mills

USE REPLY CARD—CIRCLE No. 15

A set of seven ¼-inch shank high speed Midget mills is available from Severance Tool Co., Saginaw, Mich. Each has a ½-inch diameter cutting head.

⅛-Inch Diameter Drive Rivet

USE REPLY CARD—CIRCLE No. 16

The ⅛-inch diameter drive rivet, offered by Southco Division, South Chester Corp., Philadelphia 2, Pa., is installed by tapping home a pin with an ordinary hammer. Driving the pin causes prongs at the end of the rivet to expand against the back sheet and form a permanent blind head that draws panels tightly together.

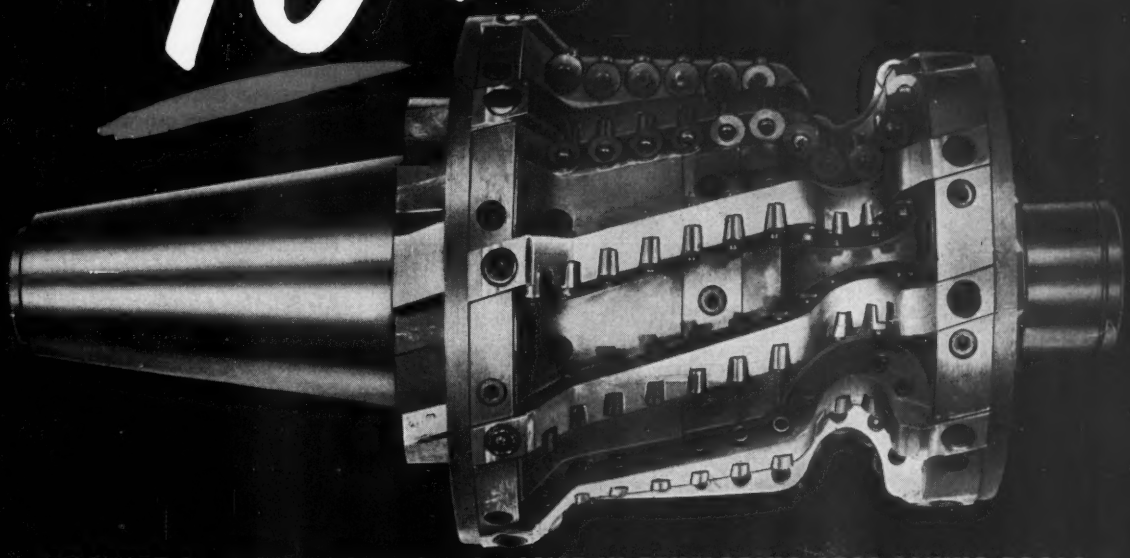
Refines Motor Oil

USE REPLY CARD—CIRCLE No. 17

Developed for all types of gas, diesel, and butane motors and automotive, marine and stationary engines, an oil refiner is offered by Oilpure Refiner Sales Co., New York, N. Y. It neutralizes destructive crankcase acids that form from oxidation of mineral lubricating oil and from combustion of fuel con-

THIS CUTTER HAS

16 LIVES!

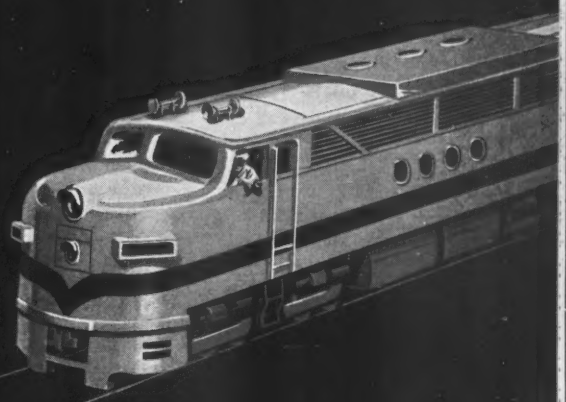


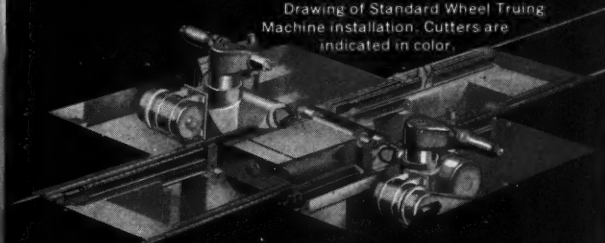
ANOTHER ILLINOIS TOOL WORKS ASSIST IN DEVELOPING COST SAVING TOOLS

An ingenious new machine developed by the Standard Railway Equipment Manufacturing Company of Chicago made locomotive wheel truing operations much faster and less costly. But cutters wouldn't hold up—the wheels themselves were work hardened by thousands of miles of service to more than 500 Brinnell!

After experimentation, Standard Railway engineers brought their ideas to Illinois Tool Works, "Headquarters for Engineered Cutting Tools." Cooperative development work produced the special form cutter shown here—and a unique new principle that permitted amazing tool maintenance economy. Removable carbide inserts can be repositioned 16 times before replacement of the inserts is necessary.

Illinois Tool Works engineers are at your service to help you solve your own specific tooling problems . . . write today.





Drawing of Standard Wheel Truing Machine installation. Cutters are indicated in color.

"Headquarters for Engineered Cutting Tools"

ILLINOIS

TOOL WORKS

2501 North Keeler Avenue
Chicago 39, Illinois

FOR BAKING • DRYING • DEGREASING • DEHYDRATING • PREHEATING

THOUSANDS OF PLANTS MODERNIZE WITH

FOSTORIA INFRA-RED

CONTINENTAL CAN CO. INSTALLATION

Pictured above is the 172-ft. Fostoria Infra-red conveyorized oven in use at the Pittsburgh plant of Continental Can for drying lacquer and enamel finishes on cans in approximately 4 minutes. This oven may be opened at any point for easy maintenance.

Cuts Unit Costs
Substantially reduces all operating cost factors. Lowest "per piece" production expense.

Speeds Production
Fastest of all heating methods. Ideal for conveyorized operations.

Saves Floor Space
Smaller oven because of high efficiency. Also easily suspended from ceiling to save floor space.

Saves Manhours
Easily turns out more pieces per day with fewer people.

Greater production efficiency is the profit key to many industrial problems today. That's why plants by the many thousands have modernized with Fostoria Infra-red. Far greater in efficiency than any other equipment, Fostoria ovens give amazing unit cost savings through faster production, greater productive use of energy, less floor space, fewer manhours. Quick recovery of investment cost follows replacement of any oven, old or new, with a Fostoria Infra-red oven. Only with such exclusive Fostoria features as Gold Plated Oven Walls and Evenray Reflectors can this new high industrial standard of production efficiency be obtained. May we show you what modernization with Fostoria Infra-red will do for you?

WRITE FOR COMPLETE FACTS
Send for this brochure of technical facts on Infra-red with case histories of many installations. Tell us about your particular problem.

THE FOSTORIA PRESSED STEEL CORPORATION

ONLY WITH FOSTORIA GOLDEN WALL EVENRAY INFRA-RED OVENS

- Highest productive utilization of energy—lowest energy loss.
- Uniform heat distribution to all product surfaces.
- Instantaneous heat, instantly controlled — no stand-by time — no overheating.
- Lowest unit production cost and finest, most durable finishes.

Listed by Underwriters'

taining sulphur; removes dirt, metallic particles, abrasives and other foreign substances in engine lubricating oil; prevents excessive dilution and vaporizes water condensation.

Amplifier for Rack Mounting

USE REPLY CARD—CIRCLE No. 18

Designed for use in standard 19-inch rack and having a 7-inch front panel, model BL-360 universal amplifier is announced by Brush Development Co., Cleveland 14, O. It is intended for use with the company's magnetic direct writing oscillographs in studies of static or dynamic strains up to 100 cps when measured by use of resistance sensitive strain gages.

Air Friction Clutch

USE REPLY CARD—CIRCLE No. 19

Flex-Disc air friction clutch for heavy duty applications is announced by Cardwell Mfg. Co. Inc., Wichita, Kans. It has no moving parts to wear; never requires adjustment; will not burn out, clog up or become affected by oil or water. Its longer friction life is due to uniform plate pressures and air cooled operation. Unit is available in single and multiple tube and plate design.

Adjustable Pallet, Skid Racks

USE REPLY CARD—CIRCLE No. 20

Improved adjustable pallet racks and skid racks are offered by Market Forge Co., Everett 49, Mass. They can be arranged to suit any particular floor plan, manufacturing line or storage plant.

Flexible Electric Light Unit

USE REPLY CARD—CIRCLE No. 21

Designated Miti-Mite, a portable flexible electric light unit is offered by Enco Mfg. Co., Chicago, Ill. It is equipped with a permanent mag-

USE A REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

72. Flat Surface Grinders

Gardner Machine Co. — "Modern Methods of Gardner Grinding" is title of 32-page illustrated catalog MM-9 which presents typical flat surface grinding operations performed on Gardner grinders. Company makes both machines and abrasives for machines which grind two parallel surfaces in one operation.

73. Resistance Welding

Weiger Weed & Co.—32-page illustrated catalog 14.650-3 on resistance welding materials lists almost 700 different styles and sizes of electrodes, plus water-cooled holders, tips, alloys, seam welding wheels and many others. General data and specifications for each are given.

74. Instrument Transformers

General Electric Co.—Basic, up-to-date information on complete line of GE instrument transformers is contained in illustrated 94-page buyer's guide GEA-4626E. Ratings, ASA accuracy classifications and prices for indoor and outdoor potential and current transformers, metering outfits and other equipment are listed.

75. Vibration Control

Felters Co.—"Why it Pays to Anchor Your Machines with Unisorb" is title of 20-page illustrated booklet on machine anchoring material which controls transmitted vibration and noise. Also included are materials on installation, advantages of system and applications to various machines, including lathes.

76. Zinc Die Casting

Gries Reproducer Corp.—In eight illustrated and diagrammed pages, brochure entitled "Small Zinc Die Castings Exclusively" presents data on properties, design advantages and uses of these tiny castings. Charts which compare cost, production and features of various fabricating methods, and list zinc alloy composition and properties are included.

77. Ratio Totalizer

Hagan Corp.—Cutaway and dimensional illustrations plus full explanation of construction, operation and features of the Ratio Totalizer are presented in 8-page bulletin 5452. Totalizer is air operated control mechanism for combining input control pressures and spring forces, and producing output control pressure based on addition, subtraction, multiplication and division of input signals.

78. Welding Rod Coatings

Foote Mineral Co.—"Raw Materials for Welding Rod Coatings" is title of 20-page illustrated technical guide for the manufacturers and users of welding rods. Alloying materials, binders and slipping agents, arc stabilizers, and fluxes and slag-forming materials are detailed, with chemical analysis and screen specifications of each.

79. Ventilators & Louvers

Burt Mfg. Co.—If you are faced with problems of factory ventilation, you may find the answers in 12-page illustrated bulletin SPV-101-D. Complete data are given on continuous ridge, gravity, free-flow fan, standard fan, centrifugal fan, low type fan and free-exhaust ventilators, ventilator bases and wall louvers.

80. Process Controllers

Foxboro Co.—32-page illustrated bulletin 461 deals with eight types of model 40 controller for such process variables as temperature, pressure, flow, pH, conductivity or humidity. Typical chart records and process diagrams are given for each instrument. Methods of selecting the proper control action by analyzing the needs of the process are covered in detail.

5-12-52

STEEL
Penton Building, Cleveland 13, Ohio

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COMPANY _____

PRODUCTS MANUFACTURED _____

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BUSINESS REPLY CARD
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STEEL
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

81. Nailable Steel Flooring

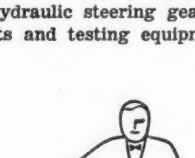
Great Lakes Steel Corp.—Applications and advantages of nailable steel flooring for railroad freight cars are described and illustrated in 8-page booklet N-S-F-1. Metal flooring sections have plastic-filled curved nailing grooves which distort the nail for holding purposes. Flooring adds strength and versatility to car and withstands rough treatment.

82. Helical Gear Drives

Foote Bros. Gear & Machine Corp. —Single, double and triple reduction type Maxi-Power enclosed helical gear drives are described in 20-page illustrated engineering manual MPB. Details of construction, selection data, service factors, load characteristics, ratings and dimensions are given for hundreds of units to aid in proper selection and application. Ratios range from 2.08:1 up to 360:1 and capacities up to 1550 hp.

83. Ring Packings

Greene, Tweed & Co.—Design features, operational data, installation procedures and suggested dimensions relative to Palmetto G-T Ring, a packing which can be used at pressures to 15,000 psi without extruding, are offered in 8-page bulletin MP-68. Uses include hydraulic and pneumatic cylinders and valves, welding machine, hydraulic steering gears, control units and testing equipment.



84. Stainless Specs

Peter A. Frasse & Co.—Chemical analysis requirements for each of 37 Military, Army, Navy, Aeronautical and Federal specifications for stainless steel are given in easily-used form on file data chart. Also listed are specified forms such as bars, wire, strips, sheet, etc., as well as nearest corresponding SAE, AISI and AMS type numbers. You can use this reference chart.

85. Strip Handling Equipment

Fried Steel Equipment Mfg. Corp. —Specifications, general information and uses of Fried Stripveyor which picks up and carries strips beyond shear bed, Strip-Stacker which stacks strips as fast as they're sheared and Liftveyor which supports wide sheets for close tolerance shearing and then moves them beyond the shear frame are included in 8-page illustrated "Free Yourself with Fried."

86. Precision Gage Blocks

Fonda Gage Co. — "Precision in Millionths" is theme of 8-page illustrated catalog which describes complete lines of Lifetime carbide and steel gage blocks and give prices of individual blocks as well as complete sets.

EDITORIAL REPRINTS:

87. Steel Industry

The 27th annual financial analysis of the Steel Industry for 1951 as compared to 1950 which supplemented a recent STEEL issue is available in reprint form. Report is compiled from data received from 30 producers representing 95.4 per cent of the steelmaking capacity in the U. S. and is headlined "Record Output Couldn't Offset Blow from Taxes."

88. Brazing Atmospheres

Developments in protective atmosphere furnaces widen the application of brazing techniques to practically all metals. Biggest advances are in controlled atmospheres. In STEEL reprint "Furnace Brazing: Atmospheres Set the Pace," S. Damon of Westinghouse's Materials Engineering Dept. discusses hydrogen, Exogas and Monogas atmospheres, some considerations in their use, oxygen control and requirements of and effects on certain metals.

89. Planned Maintenance

"Planned Maintenance Reduces Mill Delays and Production Costs" is title of STEEL reprint which briefly summarizes recommendations presented in various technical papers at annual Spring conference of AISE in Cincinnati. Program for achieving planned maintenance as followed by the Pittsburgh steelmakers of Jones & Laughlin Steel Corp. is considered.

90. Magnesium Fabrication

Crystal structure of magnesium alloys requires forming operations to be carried out at elevated temperatures. If correct techniques are used, however, savings can result from lower fabrication costs which effect lower finished cost, even though initial cost of metal may be high. STEEL reprint "Magnesium Fabrication—Lower Finished Costs" reports on various forming techniques used with this metal.

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netic base for attaching with a 50-pound pull to flat or curved metal surfaces. Unit has a 6-foot cord with plug-in for any 120 ac or dc outlet.

One-Coat Masonry Paint

USE REPLY CARD—CIRCLE No. 22

Called Mason-Coat No. 310, a one-coat masonry paint introduced by United Laboratories Inc., Cleveland, O., is an oil base paint applicable to interior and exterior of masonry surfaces. It may be applied by brush or spray. It withstands weather and temperature changes.

Cement for Polishing Wheels

USE REPLY CARD—CIRCLE No. 23

Grip Grain cold cement for polishing wheels and abrasive belts is announced by Schaffner Mfg. Co. Inc., Emsworth, Pittsburgh 2, Pa. No heat is required for drying. It cuts down time for wheel changes and its adhesive action locks emery grain to the surface.

Thermosetting Resin Compound

USE REPLY CARD—CIRCLE No. 24

Armstrong Products Co., Warsaw, Ind., announces adhesive A-6, a thermosetting resin compound that requires only contact pressure for joining and cures at room temperature. It contains no volatile solvent and does not shrink, swell or creep.

Double-Seated Valve

USE REPLY CARD—CIRCLE No. 25

A double-seated diaphragm regulating valve for use with control instruments is available from Leslie Co., Lyndhurst, N. J. Features of the device include Flow-Line contoured body, renewable interchangeable seat rings and renewable self-aligning guides. Valve is made in sizes from 1½ to 10 inches for pressures up to 600 psi.

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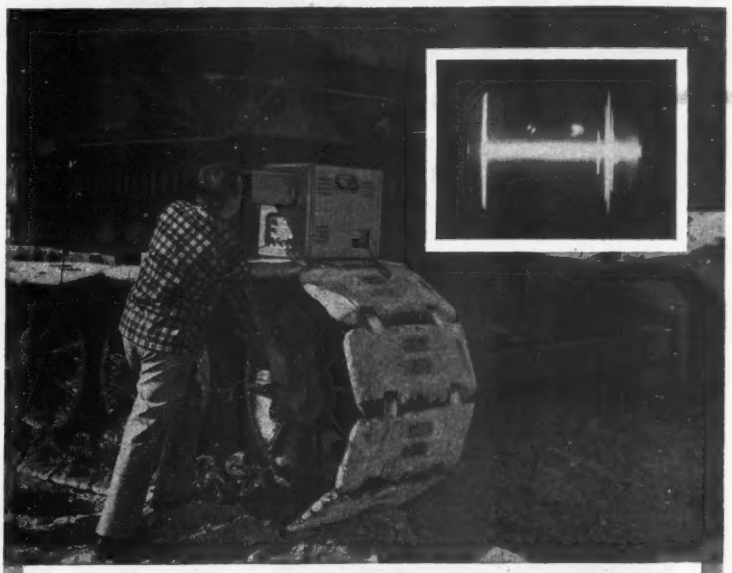
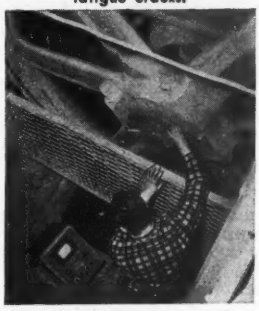
Just circle the corresponding number of any item in this section for more information.



STOP COSTLY BREAKDOWNS

WITH SPERRY ULTRASONICS

Inspecting drill bits for possible fatigue cracks.



Inspecting the main shaft of a 48- by 60-in. jaw crusher.

The unexpected breakdown of production equipment has long been a costly and unpredictable expense.

The Sperry Ultrasonic Reflectoscope, the newest most advanced non-destructive testing instrument, is now being used for maintenance inspection without the necessity of time-consuming dismantling or moving of equipment to special locations.

By testing critical equipment at reasonable intervals, fatigue cracks can be detected and their subsequent growth followed, thus allowing an opportunity to schedule replacement or repair when production is least affected.

Inspections have been made successfuliy for several years on such equipment as—hoisting engine crankshafts and crankpins, sheave axles, hydraulic press cylinders, pressure and back up rolls and in most cases without time losses due to dismantling. Materials and parts produced by equipment such as this are also inspected for defects before vital machining hours are wasted.

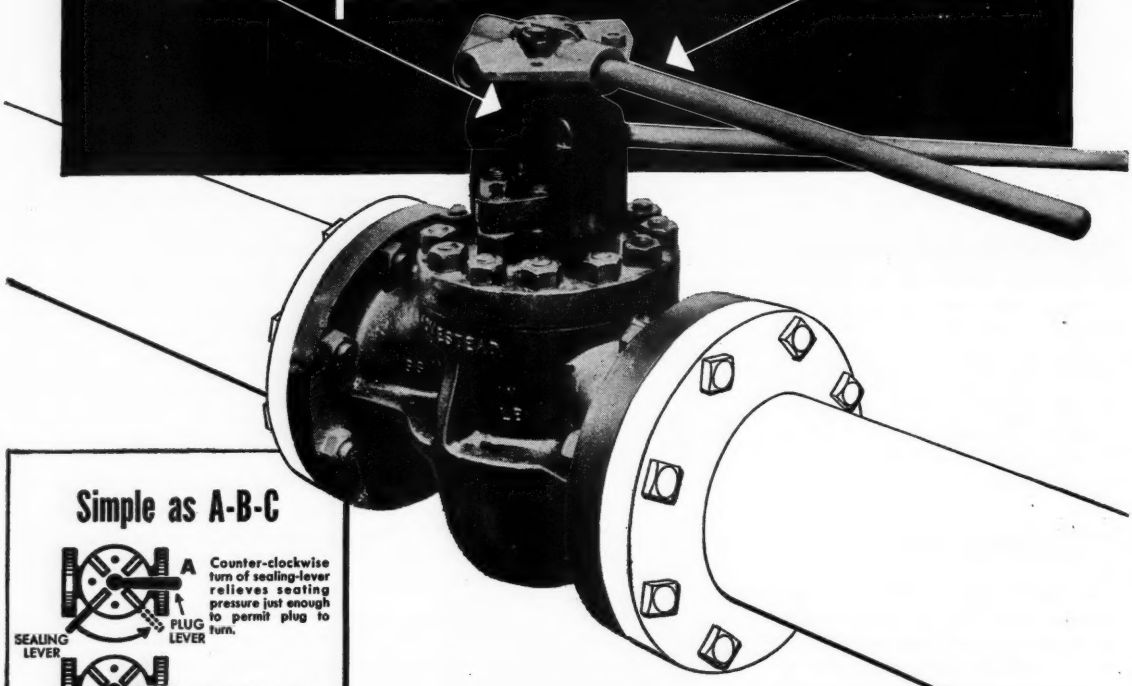
Write for complete descriptive information on day to day commercial testing service, lease or sale of the Sperry Ultrasonic Reflectoscope.

Sperry **SPERRY PRODUCTS, INC.**
Danbury, Connecticut

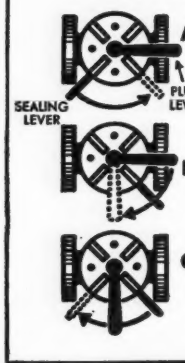
- **at all times**
- **under all conditions**
- **throughout its long lifetime of service**

This Homestead Valve will always work

it's stickproof because it's lever-seald



Simple as A-B-C



A Counter-clockwise turn of sealing-lever relieves seating pressure just enough to permit plug to turn.

B Plug lever turns plug to "open" or "closed" position.

C Clockwise turn of sealing-lever restores full seating pressure.

Homestead Lever-Seald Valves operate faster, too—16 to 28 times faster than screw-stem type valves. They require no lubrication . . . provide unobstructed, straight-line fluid flow with minimum pressure drop . . . afford maximum protection to sealing surfaces against corrosive and erosive line fluids. And because only a quarter-turn is needed for full opening or closing, they are ideal for installation in restricted areas where operation of other types of valves might be difficult.

Next time you have damaged or sticking valves, replace them with Homestead Lever-Seald Plug Valves. Once you use them you'll never be satisfied with ordinary valves.

For complete information write for Valve Reference Book No. 39-3.

HOMESTEAD LEVER-SEALD PLUG VALVES

HOMESTEAD VALVE MANUFACTURING COMPANY

Serving since 1890

P.O. BOX 22 CORAOPOLIS, PA.

The Market Outlook

STEEL INVENTORIES are better than money in the bank.

While some of the need for steel has evaporated, delivery schedules have been slowed and further interruptions in them are threatened. And there's no near-term likelihood that steel prices will drop; they're most apt to go the other way.

The steelworkers' two work stoppages in April, which caused a loss of approximately 2,360,000 net tons of steel for ingots and castings, will delay shipment of some steel products from second quarter to third quarter. Vote of the steelworkers' union last week to call another strike against the steel industry unless there is a prompt settlement of the union's long-standing wage dispute with the producers freshens the danger of further interruptions in production.

DISCONTENTED—Vehemence of the union suggests that its patience will be strained in waiting for the U. S. Supreme Court's decision in the presidential plant seizure case, even though the decision is expected sooner than usual. Certainly the union's patience will break if the court's decision is in favor of the steel industry.

While the lessened demand for steel has been felt on the order books of premium-price sellers, the need for steel is still strong enough that no significant price concessions can be expected in the regular-price market, particularly in view of further production interruptions and possible increases in steel wages and prices.

PROLONGATION—Another steel strike, particularly if it is a long one, might cause the stringency in some of the major steel products to continue through the fourth quarter. Regular-price producers who accept bookings for an entire quarter are booked full on products now in tightest supply. Another strike would delay some second-quarter deliveries into the third quarter, and, in turn, some third quarter tonnage would be pushed over into the fourth quarter.

Labor strife in the steel industry during April cut that month's steel output to the lowest level since the short month of February, 1951.

RECOVERY—Current production of steel is up again nearly to the level prevailing before the April labor trouble broke out. In the week ended May 17, output of steel for ingots and castings was at 101 per cent of capacity, compared with 83 per cent in the preceding week.

Carbon steel bars, both hot-rolled and cold-finished, continue to be in the tightest supply of all steel products. This is one product in which you can clearly see the impact of the defense program. Heaviest pressure is for the larger diameters for making shells and fuzes. Also adding to the burden on the bar mills is the production of tube rounds for shipment to England under an agreement worked out by Prime Minister Winston Churchill when he visited the United States early this year.

VARIATIONS—Carbon plate in heavy and wide sizes continues in strong demand, and regular-price producers have no trouble booking orders through the third quarter. Light plate from the continuous strip mills is in fairly easy supply. Railroad equipment builders, regarded generally as the best buyers of this material, are specifying less actively.

Demand for structural shapes continues to ease in most areas. It appears that the bulk of demand for this product will be coming from bridge, highway, street and public projects.

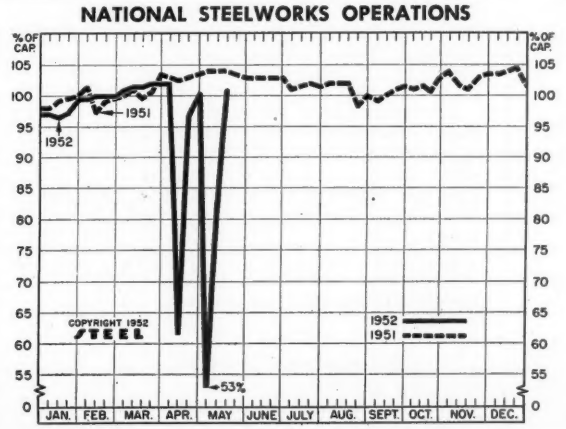
EASY GOING—Although hot-rolled and cold-rolled carbon sheets are not in as heavy demand as they were a few months ago, regular-price sellers can book orders for them as far as they wish.

Tin plate demand is relatively light, and some producers are seeking additional customers.

Deferments and order cancellations on manufacturers wire have declined but new buying is slow and uneven.

Mechanical tubing producers are seeking business, but sellers of pressure tubing find demand good from steam and power plant projects.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended May 17	Change	Same Week 1951	Same Week 1950
Pittsburgh	102.5	+20*	97	100.5
Chicago	103	+20	107.5	105.5
Mid-Atlantic	88	+ 2	101.5	98
Youngstown	105	+35	105	107
Wheeling	98	+ 7	98.5	106.5
Cleveland	102.5	+15.5*	100	99.5
Buffalo	104	0	104	104
Birmingham	102	+52	100	100
New England	70	+15	91	84
Cincinnati	90	0	101	103
St. Louis	83.5	+ 5.5	96.5	87
Detroit	101.5	+19.5*	107.5	102
Western	84	— 8.5	104	95.5
Estimated national rate	101	+18	104	101

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,925,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 53 *Production-Engineering News—p. 89*

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	May 15 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100) ..	171.92†	171.92†	171.92†	171.92	118.67
Index in cents per lb.	4.657†	4.657†	4.657†	4.657	3.215

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32†	$106.32†	$106.32†	$106.32	$69.82
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	52.54	32.99
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	32.49
Malleable Pig Iron, GT ...	53.27	53.27	53.27	53.27	33.71
Steelmaking Scrap, GT	43.00	43.00	43.00	44.00	29.42

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Primary, pending 1952 tin plate contract price announcement.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	May 15 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh.....	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.252	4.252	4.223	4.20	2.98
Bars, C.F., Pittsburgh.....	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh...	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia...	3.93	3.93	3.918	3.91	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh...	3.60–75	3.60–75	3.60–75	3.60–75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh...	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh..	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh....	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh.....	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.35
Wire, Basic, Pittsburgh ...	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh ...	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate box, Pittsburgh..	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜-⅝", Pitts. ..	4.10–30	4.10–30	4.10–30	4.10–30	2.55

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$34.00
Basic, Valley	52.00	52.00	52.00	52.00	33.00
Basic, del. Phila.	56.75	56.75	56.61	56.49	35.52
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	33.00
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, del. Phila. ...	57.25	57.25	57.11	56.99	36.02
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	29.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.33	34.75
Malleable, Valley	52.50	52.50	52.50	52.50	33.50
Malleable, Chicago	52.50	52.50	52.50	52.50	33.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	40.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.25*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts....	$44.00	$44.00	$44.00	$45.00	$30.00
No. 1 Heavy Melt, E. Pa...	42.50	42.50	42.50	43.50	29.50
No 1 Heavy Melt, Chicago.	42.50	42.50	42.50	43.50	28.25
No. 1 Heavy Melt, Valley..	44.00	44.00	44.00	45.00	30.75
No. 1 Heavy Melt, Cleve...	43.00	43.00	43.00	44.00	30.75
No. 1 Heavy Melt, Buffalo.	43.00	43.00	43.00	44.00	32.00
Rails, Rerolling, Chicago ..	52.50	52.50	52.50	52.50	33.00
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	49.00*	37.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn, Connisvl. ..	$14.75	$14.75	$14.75	$14.75	$8.75–9.50
Beehive, Fdry, Connisvl. ..	17.50	17.50	17.50	17.50	9.75–11.00
Oven Fdry, Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	21.50-24.00
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	14.80	16.80	18.80	16.80	14.80-14.85
Tin, New York	121.50	121.50	121.50	139.00	80.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ..	44.00	44.00	50.00	42.00	33.00
Nickel, refinery, duty paid.	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
NewYork, del.	....	58.28	58.78	....
Newark, del.	57.02	57.52	58.02	58.52
Philadelphia, del.	56.75	57.25	57.75	58.25
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	59.75	60.25	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del. ...	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax).....	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Nevillelsland, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50c manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2.	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2.....	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.55
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, May 15, 1952; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y. B2 ..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah C11 .....66.00
Houston S5 .....74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14.66.00
So. Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 .....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14.70.00
So. Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago, Ill. R2 ...82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 .....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.90
Houston S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ..4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah C11 .....3.65
Houston, S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.90
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5 W14..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 .....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 .....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., LA. Wide Flange
Aliquippa,Pa. J5 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah C11 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 .....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 .....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.76
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ...4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..3.95
Ashland,l.c.l. (15) A10 .4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah C11 .....3.70
Harrisburg,Pa. C5 .....6.30
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5 W14..3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 .....4.00
Youngstown R2, U5, Y1.3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah C11 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 .....3.85
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 .....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12, R2 4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ...4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 .....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ..5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13 .5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ...5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 .....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
Chicago Hts.(3,4) I-2 ..4.75
Franklin,Pa.(3,4) F5 ...4.75
FortWorth,Tex.(26) T4 ..4.85
Huntngtn,W.Va.(3) W7 .5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda(3,4) B12 ...4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrght.Iron) U1 .12.25
Economy,Pa.(S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt) B14 12.20
McK.Rks.(Staybolt)L5 .14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ...3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4 ..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ...4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ...5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
Ind.Harbor,Ind. Y1 .....5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.65
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va.W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEET, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
SoSanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	....	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N. J. C18	....	...	7.70	9.65	11.95
Mattapan,Mass. T6	....	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
New York W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.	S15 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8)	A10 3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1)	K4 10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)	K4 5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)	P12 6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)	N15 5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Muncie,Ind. I-7	8.75	9.00
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.50
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Muncie,Ind. I-7	8.70
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	Anl'd Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Muncie,Ind. I-7	6.45
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving (8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Muncie,Ind. I-7	9.10
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga.

	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala.,17-18ga.R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	205
Johnstown,17ga.,4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill.(1) N15	131

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	Std. Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16) 4.00
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

NAILS & STAPLES, Stock

To dealers & mfrs. (7).	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. S13	5.60
Johnstown,Pa. B2	5.60

Key to Producers

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Div.
N5	Nelsen Steel & Wire Co.
N6	NewEng-HighCarb.Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Div.
N14	Nrthwst. Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Division, Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RelianceDiv.,EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
T2	Tenn. Coal & Iron Div.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
U5	United States Steel Co.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	West. Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div. International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	YoungstownSheet&Tube

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

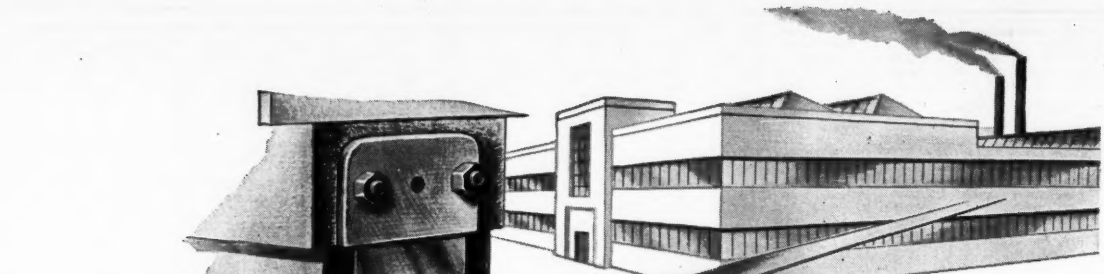
Grade by Analysis

W	Cr	V	Co	Mo	
18	4	1	....		1.505
18	4	2	....		1.650
20.25	4.25	1.6	12.25	3.53	5-3.675
19	4	2	7		2.460
18.25	4.25	1	4.75		2.125
18	4	2	9		2.445-2.45
13.5	4	3	....		1.6025
W	Cr	V	Mo		
6.4	4.5	1.9	5		0.96-0.965
6	4	3	6		1.190
1.5	4	1	8.5		0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

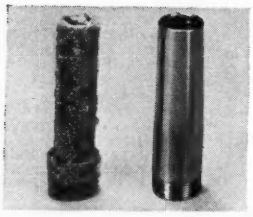
Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.

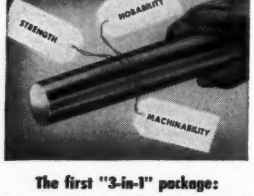


DISCOVERED:

how to fill a parts bin faster with present machinery



A new "baby" fights sulphuric acid: A few years ago industry indicated the need for a new stainless steel, to resist sulphuric acid, that could be produced in bar, strip, tube and other forms. **A•E•Service** came up with the answer: Stainless No. 20. Once again, Carpenter customers were *first* to cash-in on new, improved Stainless products.



The first "3-in-1" package: To speed moldmaking and improve molding results, the plastic industry had long sought a mold steel that combined all 3: Easy hobbing, good machinability, high strength. **A•E•Service** worked again for Carpenter customers—came up with Samson Extra, the first of its kind.

Yours may be one of the plants that is finding ways to produce more from present machinery, through Carpenter's **A**pplication **E**ngineering **S**ervice.

A•E•Service is Carpenter's way of helping its customers apply specialty steels to squeeze maximum output from existing facilities. And in the process, it goes further to simplify production methods, lower break-even points, and increase a product's worth. Actually, there's no "mystery" to the way **A•E•Service** works. It works because it packs more imagination and sweat into every application it tackles. That's why the Carpenter man digs for facts on each job . . . studies previous records . . . "lives" with the application 'til it's a success. He's after all the data he can get to apply the one steel best fitted to perform better.

This may require the talents of many men. If so, the Carpenter man calls in a field engineer, or draws on the added experience of his teammates in the Mill laboratory. And if trends in industry indicate the need for a new steel, that's a job for **A•E•Service**, too. In fact, Carpenter customers often pace their fields with dramatically new or improved products that stem from steels born in Carpenter laboratories.

A•E•Service is all this. And it is *continuing* to grow in value for those it serves.

keeps you ahead of competition

THE CARPENTER STEEL COMPANY • READING, PA.

Pioneers in improved Tool, Alloy and Stainless Steels through continuing research

STANDARD PIPE, T & C

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ¼", 1½ points lower on ¾", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜"; Wheatland, Pa. W9, 2 points lower on ½", ¼", ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜": Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3"; Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6-in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10%	Both Sides	—Sheets— Carbon Base 10%	20%	Cu Base Both Sides
302 ...	....	....	....	....	19.75	26.24–27.50	77.00
304 ...	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309 ...	30.50	35.00	....	....	....	....	....
310 ...	36.50	41.00	....	....	....	....	144.00
316 ...	29.50	34.00	....	....	26.00	35.92–36.50	....
317 ...	34.50	39.00	....	....	....	....	....
318 ...	33.50	38.00	....	....	....	....	....
321 ...	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347 ...	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405 ...	21.25	27.75	....	....	....	....	....
410 ...	20.75	27.25	....	....	....	....	....
Nickel.	33.55	45.15	41.00	54.00	....	....	....
Inconel.	41.23	54.18	....	....	....	....	165.00
Monel..	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C 22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 15
- ⅝-in. & ¾-in. 18.5
- ⅞-in. and larger ... 17.5

Longer than 6 in.:
- All diams. 14

Lag bolts, all diams.:
- 6 in. and shorter.... 23
- over 6 in. long..... 21

Ribbed Necked Carriage 18.5
Blank 34
Plow 34
Step, Elevator, Tap and Sleigh Shoe 21
Tire bolts 12
Boiler & Fitting-Up Bolts 31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ¾-in..	12	6.5
⅞-in.-1½-in. ..	9	1
1⅛-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in. .	16.5	6.5
⅞-in.-1½-in. ..	12	2
1⅛-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in..	23	17.5
⅞-in. & 1½-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller..	35	28.5
9/16-in. & ⅝-in. ..	29.5	22
¾-in.-1½-in.	24	15
1⅛-in. & larger..	13	8.5
		Light
7/16-in & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish .....48 & 10
Plated finishes .....31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged: per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 42
- ¾-in. through 1 in... 34

Longer than 6 in.:
- ⅝-in. & smaller 26
- ¾-in. through 1 in... 4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller ... 35
¼-in. diam. & larger.. 16
N.F. thread, all diams. 10

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.85c
⅛-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers—List to list-plus $1

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

—— Inches —— Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Bait., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire I-7 quotes types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416 501 and 502 and 34.25c on Type 301 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xyloi...25.00-33.50
Per ton bulk ovens
Sulphate of ammonia .$32-$45
Cents per pound, ovens
Phenol. 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron Cents
- 98+% Fe, carlots.. 17.00
- Swedish, c.l.f New York, in bags..8.85-9.95

Electrolytic iron:
- Annealed, 99.5% Fe. 42.50
- Unannealed (99 + % Fe) 36.50
- Unannealed, 99 + % Fe (minus 325 mesh) 53.50

Powder Flakes 48.50

Carbonyl Iron:
- 97.9-99.8% size 5 to 10 microns..83.00-148.00

Aluminum:
- Carlots, freight allowed 29.50
- Atomized, 500 lb drums, freight allowed 32.50

Antimony 75.85
Brass, 20-ton lots.30.00-33.25
Bronze, 10-ton lots 51.25-60.00
Phosphor - Copper, 20-ton lots 50.00
Copper:
- Electrolytic 37.25
- Reduced 33.75

Lead 26.30
Magnesium 75.00-85.00
Manganese:
- Minus 100-mesh 57.00
- Minus 35 mesh 52.00
- Minus 200 mesh 62.00

Nickel unannealed 86.00
Nickel-Silver 5-ton lots 45.00
Silicon 38.50
Solder (plus cost of metal) 8.50
Stainless Steel, 302 ... 83.00
Zinc, 10-ton lots..25.00-32.50

Tungsten Dollars
Melting grade, 99%
- 60 to 200 mesh: 1000 lb and over.... 6.00
- Less than 1000 lb .. 6.15

98.8% minus 65 mesh:
- 1000 lb and over.... 4.15
- Less than 1000 lb... 4.25

Molybdenum:
- 99.9%, minus 200 mesh 3.24

Chromium, electrolytic 99% Cr min. 3.50

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvil.fur. .$14.50-15.00
Connellsvil.fdy. ..17.00-18.00
New River foundry... 21.30
Wise county, foundry.. 15.95
Wise county, furnace. 15.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens.$22.75
Everett, Mass., ovens New England, del...*24.80
Chicago ovens 23.00
- Chicago, del. 24.50

Terre Haute, ovens.... 22.50
Milwaukee, ovens 23.75
Indianapolis, ovens ... 22.75
- Chicago, del. 26.42
- Cincinnati, del. 25.85
- Detroit, del. 26.85

Ironton, O., ovens 22.50
- Cincinnati, del. 25.12

Painesville, O., ovens..24.00
- Cleveland, del. 25.82

Erie, Pa., ovens 23.50
Birmingham, ovens .. 20.30
- Birmingham, del. .. 21.60

Philadelphia, ovens 22.70
NevilleIsland,Pa.,ovens 23.00
Swedeland, Pa., ovens. 22.60
St. Louis, ovens
- St. Louis, del. 25.40

Portsmouth, O., ovens 22.50
- Cincinnati, del. 25.12

Detroit, ovens 24.00
- Detroit, del. 25.00
- Buffalo, del. 26.89
- Flint, del. 26.59
- Pontiac, del. 25.47
- Saginaw, del. 26.92

* Or within $4.55 freight zone from works.

Wanted: a new kind of Crusader

. . . to help fight the strangest, strongest foe the world has ever known—*cancer.*

Cancer that will kill 22 million living Americans . . . unless it is controlled.

Cancer that will cause untold suffering and anguish . . . unless it is checked.

This crusader's name? It could easily be your own. You see, *he is any generous person, fighting cancer by giving freely to the American Cancer Society's Cancer Crusade.*

- He believes the light in the "lab" must not be extinguished.
- He believes his fellows must learn to recognize the symptoms of cancer and the need for early diagnosis.
- He believes more doctors, nurses and research scientists must be trained to carry on the fight so well begun.

Will *you* be that kind of crusader? Will you help us fight cancer? Remember—a victory now may mean protection for you later.

Without your support we may be defeated. With it, there is nothing we cannot do. Won't you help us by giving now . . . giving generously?

MAIL THIS COUPON TO "CANCER" C/O YOUR LOCAL POST OFFICE

AMERICAN CANCER SOCIETY
GENTLEMEN:

☐ PLEASE SEND ME FREE LITERATURE ABOUT CANCER.

☐ ENCLOSED IS MY CONTRIBUTION OF $.....TO THE CANCER CRUSADE.

Name.....

Address.....

City.....State.....

Help us fight *your* battle
Give to the
Cancer Crusade
of the

AMERICAN CANCER SOCIETY

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.39	7.11	8.55	7.05	...	6.49	7.29	9.28	6.37	6.74	7.98
JerseyCty(c'try)	6.10	6.91	8.25	6.75	...	6.19	6.99	10.48	6.07	6.44	7.68
Boston (city) ..	6.40	7.18	8.59	6.35	...	6.25	6.81	10.80	6.40	6.60	7.84
Boston (c'try) .	6.20	6.98	8.39	6.15	...	6.05	6.61	10.60	6.20	6.40	7.64
Phila. (city) ..	6.04	6.97	8.35	6.60	7.11	6.29	7.16	10.48	6.10	6.38	7.29
Phila. (c'try) .	5.79	6.72	8.10	6.35	6.86	6.04	6.91	10.23	5.85	6.13	7.04
Balt. (city) ..	5.74	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try) ..	5.54	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va. ..	6.78	...	...	...	...	6.04	7.30	...	6.30	6.30	7.15
Richmond, Va..	5.74	6.57	8.38	6.14	...	5.91	6.59	...	6.72	6.86	8.00
Wash. (w'hse) .	6.05	7.26	8.49	6.50	...	6.50	7.26	...	6.60	6.65	7.86
Buffalo (del.)..	5.74	6.52	8.43	6.30	...	5.72	6.65	10.68††	6.02	6.18	7.55
Buffalo (w'hse).	5.54	6.32	8.23	6.10	...	5.52	6.45	10.48††	5.82	5.98	7.35
Pitts. (w'hse) .	5.50	6.32	7.85	5.59	6.90	5.45	6.15	10.30††	5.65	5.65	6.89
Detroit (w'hse).	5.76	6.50	8.47	6.15	7.15	5.74	6.64	10.45††	6.09	6.14	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.14	5.81	6.25	8.91	6.15	6.02	7.39
Cleve. (w'hse) .	5.54	6.32	7.96	5.65	6.94	5.61	6.15	8.71	5.95	5.82	7.19
Cincin. (w'hse).	5.79	6.03	8.24	5.72	...	5.70	6.59	10.44††	6.04	6.09	7.23
Chicago (city) .	5.74	6.52	8.05	5.69	...	5.67	6.25	10.30††	5.85	5.85	7.09
Chicago (w'hse)	5.54	6.32	7.85	5.49	...	5.47	6.05	10.10††	5.65	5.65	6.89
Milwau. (city) .	5.90	...	8.21	5.85	...	5.83	6.51	10.46††	6.01	6.01	7.25
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.31	10.26††	5.81	5.81	7.05
St. Louis (del.)	6.02	6.80	8.33	5.97	...	5.95	6.63	10.58††	6.22	6.22	7.46
St. L. (w'hse) .	5.82	6.60	8.13	5.77	...	5.75	6.43	10.38††	6.02	6.02	7.26
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.City(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90[2]	5.70	...	5.70	7.53	...	5.85	6.10	8.23
Birm'hm(w'hse)	5.60	6.40	6.75[2]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.10[3]	9.05	6.60	10.65	6.45	8.35	11.50††	6.50	6.50	8.75
L. A. (w'hse)..	6.30	7.90[3]	8.85	6.40	10.45	6.25	8.15	11.30††	6.30	6.30	8.55
Seattle-Tacoma.	7.01	8.64	9.55	7.40	...	6.70	8.80	10.35	6.70	6.78	8.73
San Francisco..	6.50	7.88[3]	9.25[3]	6.60	...	6.45	8.20	11.15	6.25	6.50	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gauge; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore
(1951 contract prices; 1952 prices not established)

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore
Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	$20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)—	30.00-31.00

Tungsten Ore
Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 25:1 lump	nom.
Rhodesian	
45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, and 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 23.25c per lb of contained Cr. C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, 8M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: Min 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot, add 5c.

SILICON ALLOYS

25.30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 179, May 12 issue; manganese, titanium and "other" ferroalloys, page 187, May 5. Refractories prices were published on page 179, May 12.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max, 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12 % max, C 3-3.5% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%). 10,000 lb W or more, $5.00 per lb of contained W; 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min) 1000 lb or more, $6.00 per lb of contained W, less than 1000 lb W, $6.15.

* Government ceiling prices, effective May 7, 1951, f.o.b Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952.

STEELMAKING SCRAP COMPOSITE

May 15	$43.00
May 8	43.00
Apr. 1952	43.00
May, 1951	44.00
May, 1947	29.75

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings and Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00

Cut Structurals & Plate:

16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base

Foundry, Steel:

20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches.	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or/steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise, ceiling shall not exceed that for base grade (No. 1).

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

OPEN MARKET PRICES CAST SCRAP

Birmingham
(Delivered)

No. 1 cupola cast	$42.00-43.00
Stove plate	38.00-39.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston
(F.o.b. shipping point)

No. 1 cupola cast	40.00*
No. 1 machinery cast	45.00
Unstripped motor blocks	30.00

* Delivered.

Buffalo
(Delivered)

No. 1 cupola cast	43.00-44.00

Chicago
(Delivered)

No. 1 cupola cast	45.00-49.00
Charging box cast	42.00
Heavy breakable	40.00
Burnt cast	40.00
Cast iron brake shoes	41.00
Stove plate	42.00
Unstripped motor blocks	35.00
Malleable	55.00
Drop broken machinery	52.00

Cleveland
(Delivered)

No. 1 cupola cast	44.00

Detroit
(Brokers' buying prices; f.o.b. shipping point)

No. 1 cupola cast	47.00
Heavy breakable	40.00
Clean auto cast	49.00-50.00
Unstripped motor blocks	38.00
Drop broken machinery	49.00-50.00

New York
(Brokers' buying prices; delivered consumers' plants).

Cupola cast	40.00
Unstripped motor blocks	34.00

Philadelphia
(Delivered)

No. 1 cupola cast	41.00
Unstripped motor blocks	35.00

Pittsburgh
(Delivered)

No. 1 cupola cast	46.00
Heavy breakable	45.00
Charging box cast	47.00

San Francisco
(Delivered)

No. 1 cupola cast	42.00

St. Louis
(Delivered)

No. 1 cupola	45.00
Stove plate	39.00
Unstripped motor blocks	35.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	50.00

* F.O.B. shipping point.

for the purchase or sale of | *scrap*

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

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BUFFALO, N. Y. Genesee Building
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CLEVELAND, OHIO 1022 Midland Bldg.
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LEBANON, PENNA. Lurias Building
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SEATTLE, WASH. Smith Tower

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Republic Rubber Packing catches pellets that wear out iron

The rotating table of this Roto-Blast machine moves through a tunnel of storm where high-speed impellers hurl down a rain of metal pellets that knock rough edges off new-made castings.

The table top is made of a special alloy, cast hard and tough. But without protection it can't very long resist the stinging fury of the metal hailstones.

The answer is Republic Rubber Sheet Packing . . . a special, soft, perforated, 7/16-inch-thick pad of solid Republic Rubber Packing that catches the pellets and protects the table top from impact at the storm center . . . and a cloth-insert rubber-surfaced curtain that confines the ricocheting pellets to the blast area and thereby protects workmen against eye and other injuries.

Large foundries and machine companies use Republic Rubber Packing on both these jobs of protecting workmen and machines. They use Republic Packing because it lasts longer, is easier to handle and because it's supplied through local Republic Distributors who give fast, expert service.

Republic's Rubber Packing, supplied in all standard gauges in rolls or sheets, has a thousand and one industrial applications that you should know about . . . diaphragms, gaskets, cushion blocks, vibration dampeners, sealers, trough containers, protective shields, silencers . . . these are only a few of the many uses for economy-wise Republic Rubber Packing, **made of material that outwears steel.**

Republic Rubber Packing is in stock at your local Republic Distributor. Ask him about it today or write direct for complete information.

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REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

The Metal Market

Steady increase in supplies of lead, zinc and aluminum, coupled with lessening demand from consumers, strengthens arguments for decontrol of these metals. Lead price drops

PROPONENTS of decontrol in metals are gathering strong arguments in support of their case. This is particularly true in aluminum, zinc and lead which may be restored to a free trading basis this summer. This reflects larger supplies and less pressing demand from manufacturers of consumer durables.

Production of primary aluminum in March totaled 154,138,528 pounds, exceeding for the second month this year the average monthly production of 1943, the peak year of World War II. In view of this steady flow of new metal, NPA plans to eliminate direct allocation controls for about 90 per cent of all United States aluminum users in third quarter. In the final quarter, NPA probably will lift the remaining curbs, retaining only priorities to the military and atomic energy programs.

Market Expanding—Easing in the aluminum supply situation will not proceed unchecked. Assuming there is no further expansion, aluminum by 1960 is likely to be in short supply rather than in over supply, predicts Donald Browne, vice president and treasurer, Kaiser Aluminum & Chemical Corp., Oakland, Calif. Combined Canadian and United States production is expected to reach 2.5 million tons a year by 1960. This compares with an estimted demand in the United States alone by 1960 of about 2.6 million tons, including estimated requirements of the government for defense purposes without provision for full-scale mobilization.

Lead Price Drops—In the case of lead, the shortage is "a thing of the past" and, consequently, the Lead Industries Association urges prompt removal of price controls on refined lead, lead products and scrap. The market dropped 2 cents a pound May 12 to the basis of 14.80c, St. Louis. This is the lowest level recorded since September, 1950. This apparently marks the bottom for the current downtrend since a leading custom smelter will accumulate metal at that level. Prices of lead products declined proportionately.

Cobalt Needs Rising

With supplies of most major nonferrous metals increasing, cobalt remains scarce. An expansion goal calling for a 21 million pound supply from foreign and domestic sources in 1955 has been set by DPA. This goal is an increase of about 11 million pounds above the 1950 supply. The figures include cobalt content of ore, concentrates, oxide and other compounds, in addition to metal.

More than half of the planned increase will be from domestic sources, through increased cobalt recovery in refining nickel and copper, and by other methods. Industrial consumption of cobalt established a new record of 8,283,408 pounds in 1950, a 76 per cent gain over 1949, and 65 per cent greater than 1948, the previous record year. Magnet alloys continued to be the largest single use for cobalt, accounting for 35 per cent of total consumed in 1950.

Quebec Metallurgical Industries Ltd., a subsidiary of Ventures Ltd., and Frobisher Mining Corp. in cooperation with the Cobalt Smelting & Refining Co., Toronto, Ont., will build a $2 million smelter at Cobalt, Ont. This smelter will produce cobalt, silver and nickel metals and copper residues.

Aluminum Outlook Shiney

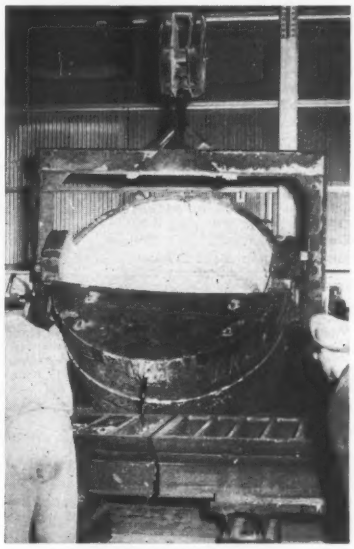
Expanded aluminum output will be absorbed in expanding markets with other basic metals

"ALUMINUM coming out of our ears" merely means that we will have a great deal of aluminum in the near future, not that we won't be able to sell it, says David P. Reynolds, Reynolds Metals Co.'s domsetic and foreign marketing vice president.

His statement comes on the eve of the opening of Reynolds Metals Co's new $80 million San Patrico, Tex. plant dedicated last Thursday.

Earwash — Although four billion pounds of aluminum will be available in this country sometime next year, Mr. Reynolds points out that the metal is becoming a really basic commodity in practically every American industry—second only to steel.

"Aluminum's growth is not a case of aluminum wiping out the copper industry," he claims. "It so happens that the aluminum industry is in a better position than the copper industry to take care of new markets and to supply the extra quantities of metals needed to meet the growth in demand. The copper markets will continue to grow, but the aluminum markets will grow still further," says Mr. Reynolds.



POURING ALUMINUM
. . . output continues to grow

Copper deposits have been worked to the point where yield is now only 1 per cent metal per ton of ore processed. Aluminum is still working on relatively high yield ore which gives 25 per cent aluminum per ton of ore processed. This means that the copper industry has to handle 25 times as much ore to get a ton of metal.

Opportunity, Not Guarantee—Coupling these resources with the unique qualities of the metal, its sustained low price, and its wide range of applications and growing markets, the future of aluminum looks very good indeed to the Reynolds firm.

"We cannot take our markets for granted, however," says Mr. Reynolds. "There is a tremendous selling job ahead."

Nonferrous Briefs

Producers' stocks of refined copper increased to 61,223 tons May 1 from 58,487 tons a month earlier—production gained while shipments to consumers eased . . . Chilean miners resumed work, but June copper supplies will be tight. Silver declined 1 cent to 86.00c an ounce.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c, 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 14.80c; chemical nom.;corroding 14.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.80c; grade 2, 18.50c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 44.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 44.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $200-$204 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 87.00c per oz.

Platinum: $102-$105 per ounce from refineries.

Palladium: $25 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor-bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53, cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze 95%, 41.30; 90% 40.82; red brass 85%, 39.83; 80%, 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85%, 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95%, 41.90; 90%, 41.42; red brass, 85%, 40.43; 80%, 39.96; best quality brass, 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 28.545; 30,000 lb lots, 28.67; l.c.l., 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4	R-317-T4	——Hexagonal—— 17S-T4
0.125	52.0	...	...
0.156-0.0188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.00	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $20.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $20.00 per cwt. Traps and bends: List prices plus 50%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50c-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, 6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb. 75.50c; 3000 to 10,000 lb. 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Sannnous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material. Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Lead: Heavy 13.00-13.25; battery plates 8.50-8.75; linotype and stereotype 15.50-16.00; electrotype 14.00-14.50; mixed babbitt 15.50-15.75.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May 13-15	24.50	14.80	19.50	121.50	19.00	44.00	56.50	86.00
May 12	24.50	14.80	19.50	121.50	19.00	44.00	56.50	87.00
May 6-10	24.50	16.80	19.50	121.50	19.00	44.00	56.50	87.00
May 2-5	24.50	16.80	19.50	121.50	19.00	44.00	56.50	88.00
May 1	24.50	17.80	19.50	121.50	19.00	44.00	56.50	88.00
Apr. Avg.	24.50	18.723	19.50	121.50	19.00	49.077	56.50	88.00
Mar. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Feb. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.60	50.00	56.50	88.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Semifinished Steel . . .

Semifinished Prices, Page 167

Pittsburgh — Steelmaking operations are back to normal with last week's production set at 102.5 per cent of rated capacity, increase of 20 points over the prior week's revised rate of 82.5 per cent. Wheeling operations increased 7 points to 98 per cent.

Sheets, Strip . . .

Sheet and Strip Prices, Page 167 & 168

New York—There is little uniformity in demand for sheets from appliance manufacturers. Some consumers are specifying lightly and in a few scattered instances actually cancelling tonnage. Others are specifying freely. Despite lack of interest on the part of some appliance manufacturers, leading sellers of hot and cold-rolled sheets are booked up throughout third quarter. Some have reduced allotments for that period because of recent work stoppages. Low silicon sheets are available within six to eight weeks, although high grade silicon delivery promises are well extended. At least one large producer is booked well into the fourth quarter. Straight chrome sheets and strip can be had in July and August. Chrome nickel stainless can be had in August and September under high priority.

Boston—With few exceptions, consumers of narrow cold-rolled strip with third quarter allotments are not pressing to place orders. Many have adjusted inventories for vacation shutdowns during next quarter and new buying is spotty. Demand for alloys required for chain holds up with some slight letdown in the lighter sizes. Sheet buying is also uneven. Fabricators with military contracts are pressing for tonnage, but consumer goods demand is dragging. Nickel-bearing stainless flat-rolled is most extended with some producers sold out through third quarter.

Philadelphia—Easing of credit terms may stimulate buying of consumer durables, but it is too early to say to what extent current sheet and strip demand will be affected. Although sheets are under less pressure than some other products, most sellers of hot and cold-rolled carbon material are well booked for third quarter. Galvanized sheet supply remains tight.

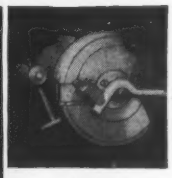
Pittsburgh—District producers' third quarter order books are filled. Only product that will be open for bookings is silicon electrical sheets which, currently, are running about 90 per cent of capacity due to cutbacks in consumer durable goods. All other flat-rolled products are in firm demand due to the two work stoppages which set producers back an estimated 22 days' output. As a result, carryover into third quarter will be substantial and business should be strong into fourth quarter. Galvanized sheets are in slightly better supply.

San Francisco—Third-quarter order books are filled. Some aggressive selling, however, is required to get bookings up to maximum.

Cleveland—Most district sheetmakers are booked through third quarter, and barring cancellations, will not be

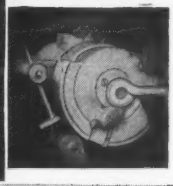
Hydraulic Eye-Bender . . .

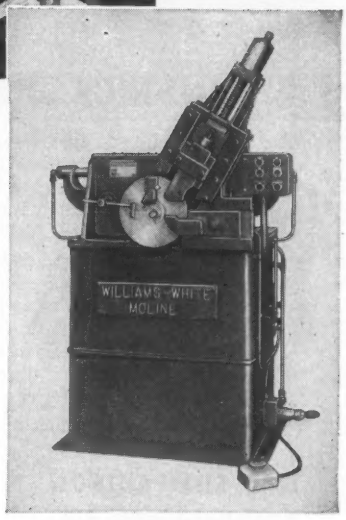
for production shaping of small stock and forming round or oval eyes, hooks, etc.



Above
Starting bend

Below
Finished eye





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- Strokes per minute, 20

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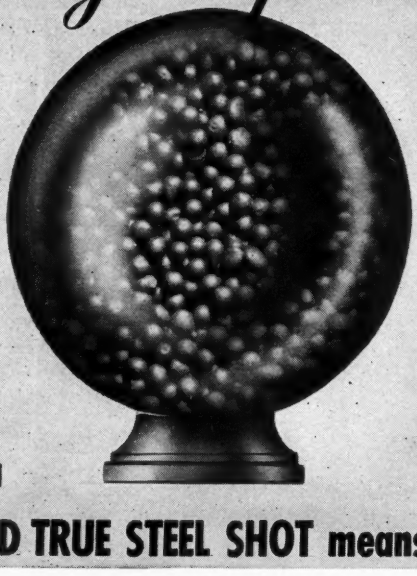

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No. 230 at Mag. 10x

after 1500 passes

TRU-STEEL
No. 230 at Mag. 10x

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It shows where the average blast cleaning dollar is spent and how savings can be made. Send for your copy today.

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able to accept much additional tonnage for the period. Automotive requirements are heavier. Expectations are the lifting of credit restrictions on installment business, in time, will bring out added volume demand for steel from the appliance manufacturers. Despite the general dullness in appliances, sheet sellers here report they have continued to book substantial tonnage from these interests right along though pressure for deliveries has been off somewhat. Sheet production again is back to prestrike levels but producers are apprehensive of another work stoppage in event the Supreme Court rules in favor of the steel companies in the Truman plant seizure case, with the wage-price issue unsettled.

Birmingham—The slight slackening in demand for sheets, evident here for some weeks, has not intensified. Pressure on producers, however, is easier.

Steel Bars . . .

Bar Prices, Page 167

Cleveland—Pressure for bars is unrelieved with demand continuing to run in excess of supply. The pinch appears more severe in carbon than in alloy grades, and more noticeably in the larger sizes. Forge shops are unable to obtain all the tonnage they require, though their supply position is improved as compared with some time back. Order books are practically filled for third quarter, and little open tonnage for the period is indicated unless some cancellations come through. Recently, some alloy bar tonnage was cancelled, in one instance involving 1000 tons. These cancellations, it is reported, permitted makers to offer tonnage for delivery in the current quarter.

Boston—Cold-finished carbon bars in smaller sizes have eased slightly, but heavier stock, 1-inch and over, is among the tightest of steel products. Flats in all grades, notably high carbon, are also scarce. Consumers lost some inventory as result of production losses, but expect to build up again by early third quarter when consumption will drop with vacations. To meet fuze and shell requirements directive set-asides for July will be larger, also semifinished for hot-rolled bars. Alloy steel forging backlogs increased 100,000 tons in two months to 720,000 tons this month, about 25 per cent.

New York—Stringency continues in hot and cold-rolled carbon bars; also cold finished alloy bars, all leading sellers being well booked throughout third quarter. Some space is still available in that period for hot alloy bars. Due to recent labor disruptions, leading producers have had to cut down on third quarter allotments in hot and cold bars.

Philadelphia—No letup is noted in carbon bar demand. Most producers are turning away tonnage. Few, if any, soft spots are seen, deferments and cancellations being practically nil. Special pressure is still on the larger diameters, due to shell work. Forgers and machinery builders are active and the lag in automotive buying is being taken up by requirements from other directions.

Pittsburgh—Automotive and military-defense accounts are sustaining high demand for all types of bars

from district producers. Books are completely filled for third quarter and mills are unable to accommodate many buyers still seeking tonnage. A least a month's carryover at end of second quarter will complicate the supply-demand picture here. Hot-rolled and cold-finished bars in the larger sizes are hardest to obtain.

Wire . . .

Wire Prices, Page 169

Chicago—Demand for merchant wire products has been hindered by bad weather and western floods. Jobbers and dealers have reasonable inventories and continue to watch their buying carefully. This slackening has made it possible for wire mills to provide more volume to urban area jobbers. Demand for furniture spring wire is down 40 to 50 per cent. Common nails are in relatively good supply, but special types are still tight. Building and paving mesh is in strong demand with production being allocated closely.

Boston—Although deferments and cancellations have declined, new wire buying is slow and uneven. Third quarter schedules are filling slowly. Self-certification of wire orders up to 60 tons per quarter will in effect release controls on much volume and should contribute toward more orderly lead-time for scheduling. Commodity rate on wire rods from Worcester to New Haven, car-load shipments, will be established by the New Haven railroad at $1.74 per gross ton. Rate has been $2.25. This rate applies only on rods to be converted in wire articles for reshipment from New Haven.

Birmingham—Advent of favorable weather has bolstered an already brisk demand for wire products, especially fencing and nails.

Plates . . .

Plate Prices, Page 167

Boston—John G. Alden, Inc., Boston, is central procurement agency and will supply working plans for construction of forty-one 45-foot steel harbor tugs for the Army. These tugs will be built by yards outside New England. Tank inquiry is heavier, both welded small units and field erected storage plants. Plate producers are booking for August delivery in heavier volume. Boiler shop requirements vary widely. Smaller boiler plants often are not operating much above 50 per cent of capacity while large unit shops are frequently employing three shifts, although hampered by lack of large plates in wide widths and sizes. Chemical plants are taking a fair volume of clad plates with considerable pulp and paper work in the planning stage.

New York—Leading plate producers, not quoting premium prices, are booked up throughout third quarter. This applies to the lighter gages as well as the heavier. Mills, quoting moderate premiums are well booked ahead on the heavier gages. Where they are not booking on a month-to-month basis they are virtually sold up for the entire third quarter on the heavier plate and are building up a good backlog of light gage tonnage. Those booking on a monthly basis are now allocating for August.

Philadelphia—Strip plate is in fairly easy supply. But sheared plate in the heavy gages is tight and in the light thicknesses moderately so. Strip plate can be had for July. Railroad equipment builders are specifying less actively. Shipyards are confining most of their specifications to sheared plate. The oil industry, public utilities and heavy, special machinery builders are pressing for heavy gage sheared plate. These consumers also account for a substantial amount of buying of light gage material. Certain larger producers, quoting minimum prices, say their sheared plate capacity is booked for the third quarter. A couple mills selling on a monthly basis only recently opened books for August and are having no trouble filling schedules.

Pittsburgh—No change is noted in the firm demand for all sizes of plates. Wider, heavier material continues in tight supply but the narrower, thinner stock rolled on continuous hot-strip mills is more freely available. About 16 days output will be the carryover into third quarter due to the two work stoppages and with third quarter books filled, supply will continue tight until well into fourth quarter.

Birmingham — Plate supplies are short. Notwithstanding some slackening here and there, requirements for carbuilding and ship repair work remain constant. Tank production also is well sustained.

Tubular Goods . . .

Tubular Goods Prices, Page 171

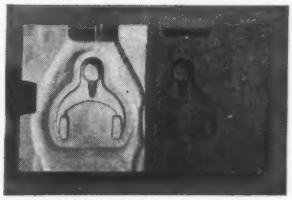
Washington—Changes in specifications of the armed services to permit greater use of welded steel tubing are under consideration. At a meeting of the Welded & Seamless Tubing Technical Industry Advisory Committee with the National Production Authority it was brought out present capacity of seamless mills is limited, while some manufacturers of electric resistance welded mechanical tubing are booked to less than capacity for May and later months. Attention of the Aircraft Production Resources Agency was called to the fact effective use of manufacturing capacity is curtailed by specifications which do not include alternate materials, and APRA advised it would make certain changes in line with committee suggestions.

Los Angeles—Demand for pipe and tubing is easing. Southern California Gas Co. reports supplies of 6-in. buttweld pipe ample for its 1952 replacement and new pipe programs. Company says its tubular goods needs may decrease next year.

San Francisco—Discounts are reported offered by some dealers on plumbing sizes of pipe—both black and galvanized. Stocks are substantial, possibly reflecting a temporary condition due to a tieup in building because of a carpenters' strike. Demand is heavy for the larger sizes.

Seattle—Cast iron pipe agencies report small sales out of stock, no large projects being up for immediate action. A Navy job at Kodiak, Alaska, involving 300 tons of cast pipe, is reported postponed. Improvements at Fort Lewis army post require considerable cast iron mains.

The cost of close tolerance finishing can vary almost as much as the weather. Through development of wet blasting, large savings have been made possible in finishing costs . . . and now Liquamatte makes wet blasting EVEN MORE practical, economical and convenient. The Liquamatte has 14 advanced design features that overcome the many



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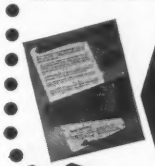

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Tin Plate . . .

Tin Plate Prices, Page 168

Pittsburgh—Tin mill production is back to normal. Due to the favorable inventory position of most consumers, mills report they have not been pushed for stepped-up delivery schedules. Open space on third quarter books is reported by mills but they see much unplaced business still in the offing.

Structural Shapes . . .

Structural Shape Prices, Page 167

Pittsburgh—Mills note a slight falling off in demand for shapes due to the slow allocation of CMP tickets to some claimants by NPA. However, definite improvement is seen during the next 4 to 6 weeks with improved building schedules in prospect. It is hard to secure some of the larger flange sections from either mills or warehouses. Carryover will not be too much of a problem. Mills expect reasonable supply-demand balance by October.

New York—Bridge work and other public construction dominates district structural demand. However, some sizable commercial work, including at least two office buildings, is contemplated and prospects point to further improvement over the next few months, now that government restrictions have been eased in various distress areas, of which the local district is one.

Boston—Slackening in structural projects up for estimates, indicates bulk of activity in coming months will be on bridges and public work, including military installations. Flow of plain material to fabricating shops is improving. Backlogs with district shops are smaller and price competition is sharper. Limited number of bridge specification has included alternates on pre-stressed concrete, but quotations have disclosed no price advantage with some disadvantage in erection costs.

Philadelphia—Larger district fabricators have substantial backlogs, ranging up to eight months and beyond. The small and medium-sized shops, however, are having a struggle to sustain normal operations. Washington does not regard this as a distress area and hence hasn't let down the bars much on commercial construction.

Los Angeles—Demand for structurals is tending upward, stimulated by rising construction requirements. Principal source of demand is from public highway, street and bridge construction, which last month was at the highest level in the Southwest since August 1951, and 86 per cent higher in valuation than in March.

San Francisco—Inquiries for fabricated structural steel are reported better, with the supply of shapes improved.

Seattle—Considerable shape tonnage is pending, particularly for Alaskan projects. Some awards await appropriations for the coming fiscal year. University of Washington teaching hospital bids involving 1200 tons shapes will be called June 12 and for a similar project for the University of Oregon in late June. Bids are in for material and maintenance buildings, Boeing Airplane Co., Seattle, 1550 tons. Fabricators' backlogs extend into third quarter. Some shops, short of forward business, are seeking new orders.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 167

Boston—Concrete steel bar contracts of 2500 tons, include 1100 covering a contract for a state prison, Norfolk, Mass. Inquiry including building mesh, is holding. Most distributors can handle considerably more tonnage. Bridges and housing requirements are substantial. Shop fabricating facilities are taken up to capacity, although in some cases bar tonnage will not be required for a year or more.

Los Angeles—Engineering awards for southern California, southern Nevada and Arizona totaled $16,095,467 in April, highest since November, 1951, and a jump of 49.5 per cent over March.

San Francisco—California reinforcing steel contractors are bidding on jobs in the Pacific Northwest where demand for bars is much greater than it is here.

Seattle—Local mills have regained their pre-strike production stride. Deliveries are being speeded up. Considerable new business is pending, much of it reinforcing bars. Recent placements consisted of tonnages of less than 100 tons each. Demand for small lots is brisk.

Pig Iron . . .

Pig Iron Prices, Page 166

Cleveland—Although foundry requirements for pig iron are down the furnaces are still shipping all of their output and no yard piling of tonnage is noted. Consumer inventories are up, largely due to slower rate of melting, though the recent lifting of the inventory limit to 60 days permitted some shops to add to their stocks. With the steel wage-price issue still unresolved, and another work stoppage anticipated in event the Supreme Court rules in favor of the industry in the Truman plant seizure case, it would not be surprising if demand pressure noticeably increases over the next few weeks.

American Steel & Wire Division, U.S. Steel Co., last week relighted its stack here that has been down for repairs the past several weeks. Two blast furnaces of Interlake Iron Corp. at Toledo, O., are strikebound for the fourth week and foundries dependent on these stacks for iron supplies are being pinched for tonnage. Workmen at these furnaces are members of an AFL union.

Detroit—Continuing strike at Interlake Iron Corp.'s Toledo blast furnaces has several large foundries in this area in distress for iron. Some borrowing has been possible from foundries with other supply sources, but this week a number of melters fear they will exhaust their inventories. Maintenance of the desired pig iron to scrap ratio has not been possible in some cases and there is a possibility cast scrap grades will tighten up.

Boston—Shipments from the Ev-

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erett blast furnace are expected to absorb production for a few weeks but unless the foundry melt increases, the furnace may soon be piling iron. Hardest hit among consumers are jobbing shops and textile mill equipment builders.

New York—Pig iron is moving more freely. With gray iron shops operating at a slow pace, iron supply is adequate. Some consumers continue to lay in stocks within the 60-day limitation set by the government, and are now using more pig iron in their melt than has been the rule over recent months. Coke supply is more than adequate.

Buffalo—Although demand for pig iron is slower, no piling of merchant tonnage by the furnaces is yet reported. Shipments from this district to other areas continue. Small jobbing foundries appear hardest hit by slack business. The only blast furnace down for repairs here may be relighted this week.

Philadelphia—Pig iron supply is approaching adequacy. Demand pressure is definitely off, as most gray iron shops are operating none too actively and their iron inventories are gradually being built up. In general, jobbing foundries are in no better position than they were early in the month. As the Reconstruction Finance Corp. has rejected application of Central Iron & Steel Co. for a loan of $55,955,000, it appears the company's plans for building two blast furnaces in the district will be deferred indefinitely.

Pittsburgh—Recent work stoppages has had a tightening effect on the merchant iron market here. If the Supreme Court's decision is favorable to the steel producing companies, and is followed by a strike, the supply-demand situation is certain to worsen. Even today a few consumers here are beginning to worry about their iron inventories. However, no production curtailments are noted. Foundry activity still remains off from normal levels due to curtailment in housing and consumer durable goods. All blast furnaces are back in operation with the exception of those that are down for repairs. American Steel & Wire furnace No. 2 at Donora, Pa., damaged during the first walkout, has been repaired.

Chicago—Pig iron lost in the recent steel workers' strike aggregated between eight and ten days' output, sufficient to cause an appreciable tightening in the supply-demand position. Suppliers are obliged to allocate their tonnage more closely than previously. Most foundries have reasonable inventories and are not pressing for shipments to any degree. Of the district's 42 blast furnaces, 40 are active.

Birmingham—Pig iron sellers are doing no stockpiling but they are looking ahead to the time when they will face a buyer's market. Some proffered tonnage still is being declined.

What is believed to be an all-time record in overhauling a blast furnace was set by Sloss-Sheffield Steel & Iron Co. which completed work on its No. 2 city furnace in 16 days, 1.5 hours. Time was calculated from the moment wind was taken off until the torch was applied. The stack has capacity of 450 gross tons daily.

Warehouse . . .

Warehouse Prices, Page 173

Philadelphia — District warehouses are increasing sales efforts to sustain business. Sheet demand is erratic and light plates are moving none too well. On the other hand, demand for bars and light shapes exceeds supplies.

Pittsburgh — Warehousemen are elated over the removal of the government's embargo on shipments. Customer demand is good but the old problem of unbalanced stocks size-wise is bothering operators. Products hardest to find in this market are wide and heavy gage carbon plates, cold-finished bars, large size rounds and flats, seamless tubing and nickel stainless steels. Mills are back about a month in their shipments.

Cleveland—Output loss due to the recent work stoppages in the steel industry will prevent attainment of a balanced stock position by the warehouses until later in the year than had been expected. Receipts from the mills will be adversely affected, though the distributors expect they will get favorable treatment in the matter of distribution of tonnage. Currently, demand on the warehouses is described as fair to strong. Because of unbalanced stocks, customers still must shop around to get their needs filled. However, demand pressure is not what it was some months back and the distributors are actively soliciting orders. Sluggishness is especially noticeable in the case of secondary sheets. Bars and heavy plates continue in most stringent supply at warehouse level, with the sheets, strip and light plates readily available.

Chicago—Warehouses are reflecting effects of the recent steel strikes by loss of inventories with stocks unbalanced as to products and sizes. Although receipts from the mills have returned to normal some time will elapse before the pre-strike position can be restored.

Birmingham — Warehouse steel stocks, while more plentiful than they were a few months ago, are only sufficient to care for current demand. Shipments are well sustained.

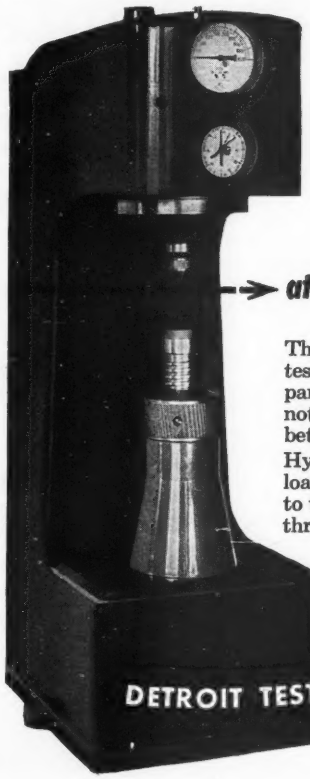
Los Angeles—Steel deliveries to warehouses have been postponed 30 to 60 days due to mill scheduling setbacks caused by heavy directive programs coupled with strike interruptions. Demand is steady at the April level.

Seattle—Warehouse industrial sales, probably due to extensive public works, are at a steady level. Some government work is slowing, awaiting appropriations. One large seller states its third-quarter allotments are no larger than for first quarter this year. Buying is extended to other areas, as West Coast mills cannot meet the demand.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 171

Chicago — Suppliers are finding customers for all foundry coke produced but selling effort is required to do so. With most gray iron foundries melting well below capacity, demand for fuel continues soft.



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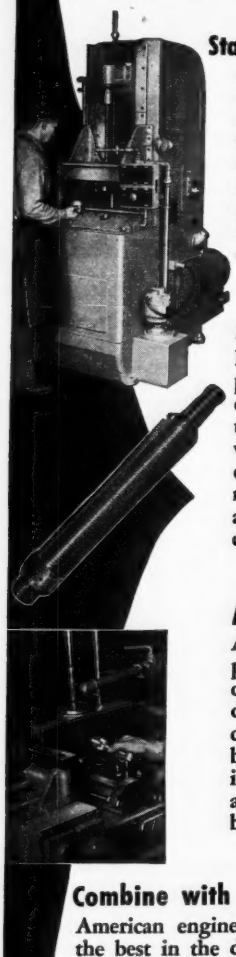

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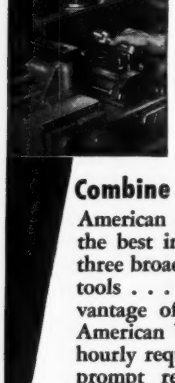

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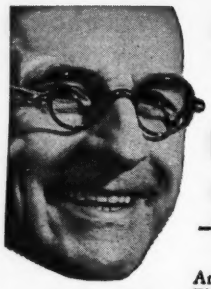

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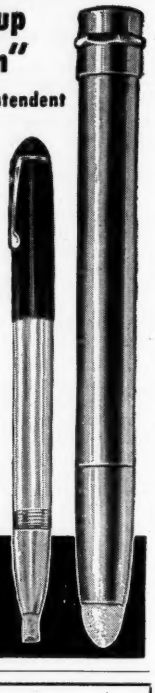

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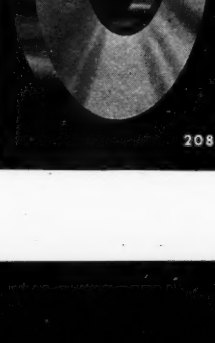

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Scrap . . .

Scrap Prices, Page 174

Pittsburgh — Shipments are again moving with regularity throughout the western Pennsylvania area and mills while extremely quality-conscious are slowly building up stocks. Average supply of major consumers is now reported in excess of a month's supply. Many have much better inventories. Talk is heard of discontinuing scrap collection campaigns as consumers may be looking for price reductions if the supply appears to be mounting fast. Demand is still good for the better grades of open-hearth and electric furnace material. Cast is practically at a standstill with tonnage price reductions of up to $5 delivered reported for dealer cast.

Cleveland — Quality steelmaking grades of scrap are moving steadily to the mills but with inventories ranging upward from 30 days, on the average, the pressure for tonnage is definitely off. Meanwhile, manufacturing operations are curtailed in various directions, notably in consumer durable lines, and industrial scrap is not coming onto the market in the usual volume. This possibly may forecast a shortage of this class of material in the making. Demand for blast furnace grades is extremely sluggish and the appearance of price easiness in this area of the market would not be surprising. Cast iron grades continue weak pricewise with demand slow.

Detroit—The cast scrap market bids to become more lively if foundries who rely on pig iron from the Toledo furnaces of Interlake Iron Corp., now strikebound, are unable to find new supply sources. Traders last week felt the market was in a state of flux, a lot of poorer grades of cast scrap going begging. On the basis of a sale of heavy breakable at $40, that item is weaker. However, one large buyer is reportedly offering $42 for charging box cast and geting no nibbles. Open-hearth material is holding at ceiling but standards are rigidly enforced on No. 2 bundles and heavy melting. Blast furnace grades are anything but strong at ceiling prices.

Boston—Cast scrap still sags with shipments to consumers light. Cupola cast has sold as low as $40 delivered, or about $10 under ceiling. Motor blocks are at a standstill and other cast grades are below ceiling.

New York—Further easing in demand for cast grades is noted. Cupola cast and unstripped motor blocks still are softening pricewise. Pressure for steel grades is only moderately strong.

Buffalo—Prices on No. 1 cupola cast scrap skidded $6 to $7 per ton under the government ceiling with buying interest negligible even at the lower prices. Softer tendencies also prevail in steelmaking grades.

Philadelphia — Undertone of the scrap market continues to ease. Prime open-hearth grades are in good demand, but pressure is off and secondary grades are moving only fairly well. One district mill is still holding up shipments on No. 2 heavy melting and No. 2 bundles. Low phos No. 1 is not active locally, but demand from Pittsburgh is taking up the slack. Leading trade interests look for spotty demand for most steel grades for some weeks to come and anticipate further softening in cast. Cupola cast has dropped to $41, delivered, and unstripped motor blocks to $35. Other cast grades are weak.

Chicago — Scrap supply has improved to the point where only heavy melting open-hearth grades are moving in steady volume. Strike interruptions actually resulted in inventory improvements. Minimum stocks now range from 30 days upward.

St. Louis—Price weakness is showing up in open hearth grades of scrap. Some mills are limiting the springboard they will pay to $2, plus a refusal to pay the recent 9 per cent freight rate increase, which averages here around 45 cents per ton. The whole market is hesitant, with mills' stockpiles the highest in a year. They are taking delivery on outstanding orders but are placing new ones cautiously and for small tonnage. Consumer sentiment with ground supplies good, is that it may pay to see whether ceilings or controls end. Consensus is prices on open-hearth grades will drop below ceiling soon.

Birmingham—The scrap market is marking time. Reasonable supplies of melting steel are available for open-hearth users. Demand for most cast grades has improved little in the past week or 10 days.

Los Angeles—Mills are not pressing for delivery and No. 2 bundles are selling $5 below ceiling. Despite increased activity of soil pipe foundries, which consume 60 per cent of all cast iron scrap used in this district, cast scrap prices have slid $8 to $10 below ceiling.

San Francisco—Except for No. 2 bundles, quoted $5 below ceiling, prices on the open-hearth grades of steel scrap are firm. Mill inventories are described as good. Cast iron scrap continues in the doldrums. No. 1 cupola cast is weak at $42 a ton.

Rails, Cars . . .

Track Material Prices, Page 169

New York—Domestic freight car awards of 397 in April were the lightest since October, 1949, when 201 cars were placed. Backlogs, according to the American Railway Car Institute and the Institute of American Railroads, were 108,270 cars, as of May 1, reflecting a further downward trend. Deliveries totaled 7403 for April, against 8159 in March and 8274 in April a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1810 tons, four warehouses and property office, naval advance base supply depot, Davisville, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; B. Perini & Sons, Inc., Framingham, Mass., general contractor; reinforcing steel to same fabricator.

1800 tons, state bridgework, Northampton county, Pa., through Wagner Construction Co., Kingston, Pa., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, plant addition, Kimball Glass Co., Millville, N. J., to Belmont Iron Works, Eddystone, Pa.

900 tons, Army warehouse No. 85, New Cumberland, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

760 tons, state bridgework, Lehigh county, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

200 tons, contract 3, state prison, Norfolk, Mass., to West End Iron Works, Cambridge; Farina Bros. Co., Newton, Mass.,

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190 tons, high school building, Worcester, Mass., to United Structural Steel Co., Worcester; J. W. Bishop Co., Worcester, general contractor; 70 tons reinforcing bars to Bethlehem Steel Co., Bethlehem, Pa.

160 tons, plant addition, Keystone Drawn Steel Co., Spring City, Pa., through Hughes-Foulkrod Co., general contractor, to Morris Wheeler & Co., Philadelphia.

120 tons, switch yard material, Pennsylvania Power & Light Co., Martins Creek, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

2900 tons, state bridgework, Berks and Schuylkill counties, Pa., bids June 6.

2700 tons, addition, state hospital, Philadelphia, opening of bids postponed to May 21.

2050 tons, fabricated structural steel; bids direct to Corps of Engineers, Omaha, Nebr., May 23.

1550 tons, materials and maintenance buildings, Boeing Airplane Co., Seattle; Union Steel Co., Los Angeles, low; $2,500,000 project, plans by Austin Co.

1500 tons, state bridge, Baltimore, Booth & Flynn, Pittsburgh, low on general contract.

1200 tons, teaching hospital, University of Washington, Seattle; bids to Board of Regents, June 10.

550 tons, state bridgework, Lehigh and Northampton counties, Pa., bids June 6.

416 tons, state bridge, Luzerne county, Pa., bids June 6.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1100 tons, contract 3, state prison, Norfolk, Mass., to Concrete Steel Co., Boston; Farina Bros. Co., Newton, Mass., general contractor.

1000 tons, substructures, surface roads and approaches, sections D-1 and H-1, Fitzgerald Expressway, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; V. Barletta Co., Boston, general contractor.

550 tons, 10-story building, United Gas Co., Shreveport, La., to Truscon Steel Co., Youngstown; The Werner Co., Shreveport, general contractor; 75 tons, fabricated structural steel to Industrial Steel Products Co., Shreveport.

210 tons, grade separation structures, Madison county, New York, to Truscon Steel Co., Youngstown: Brunalli Construction Co., Southington, Conn., general contractor; 675 tons, fabricated structural steel to Pine Brook Iron Works, Scranton, Pa.

200 tons, general warehouse, naval air station, Quonget Point, R. I., to Plantations Steel Co., Providence; A. J. Halloran, Providence, general contractor; 550 tons, fabricated structural steel to Haarmann Steel Co., Holyoke, Mass.

170 tons, service building, hospital, Forest Hills, Boston, to United States Steel Supply Division, U. S. Steel Co., Cambridge; J. A. Singerella Co., Dorchester, Mass., general contractor; 40 tons structural steel to Quincy Ornamental Iron Works, Quincy, Mass.

100 tons or more, housing project Conn. 6-1, Waterbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; B. Perini & Sons, Inc., Framingham, Mass., general contractor; fabricated structural steel to Grossman Steel Stair Co., New York.

100 tons, plant building, Shea Chemical Co., Columbia, Tenn., to Connors Steel Co., Birmingham; M. M. White Construction Co., Columbia, general contractor.

100 tons or more, housing project MR-40, Trumbull avenue, Bridgeport, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; E. & F. Construction Co., Bridgeport, general contractor; fabricated structural steel to Grossman Steel Stair Co., New York.

REINFORCING BARS PENDING

2391 tons, state bridgework, Berks and Schuylkill counties, Pa., bids June 6.

250 tons, two Washington state highway bridges, Lewis county; Rumsey & Co., Seattle, general contract, low $214,690.

140 tons, also 75 tons pipe and miscellaneous, Grand Coulee pumping plant; bids soon to Denver.

PLATES . . .

PLATES PENDING

250 tons, 500,000-gal. elevated steel water tank, air field, Charleston, S. C.; bids to Corps of Engineers, Charleston.

250 tons, 500,000-gal. elevated water tank; Donaldson air force base, Greenville, S. C.; bids to Corps of Engineers, Charleston.

250 tons, 500,000-gal. elevated water tank; bids May 27, to Corps of Engineers, Norfolk, Va.

PIPE . . .

STEEL PIPE PLACED

220 tons, 30-in. steel fabricated pipe, Dupont interests, Dunbarton, S. C., to Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Norfolk & Western, 15 steam switch engines to own shops.

Utah railway, three hundred 1600-horsepower diesel-electric road switching locomotive units, to the American Locomotive-General Electric Companies, Schenectady, N. Y.

RAILROAD CARS PLACED

Delaware, Lackawanna & Western, 100 seventy-ton covered hopper cars to the American Car & Foundry Co., New York.

Fruit Growers Express Co., 500 fifty-ton refrigerator cars, to Pacific Car & Foundry Co.

Norfolk & Western, 1525 miscellaneous freight cars, to own shops, and 500 box cars to Pullman-Standard Car Mfg. Co., Chicago.

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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

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Rohr To Build $2 Million Plant

Rohr Aircraft Corp., Chula Vista, Calif., will construct a $2 million plant in Riverside, Calif., for production of complete power packages (nacelles) for the Boeing KC-97 Stratotanker, a giant plane used for midair refueling of aircraft.

Drop Forger Plans Plant Expansion

J. H. Williams & Co., Buffalo, manufacturer of drop forgings, will expand its plant facilities at a cost of about $750,000. About 20 per cent of the outlay will go into buildings and 80 per cent into equipment. A 3000-ton press will be installed in a plant addition.

Ferro Opens Nashville Factories

Four new factory buildings designed by Luria Engineering Corp., New York, for Ferro Corp., Cleveland, have been completed at Nashville, Tenn. The new structures are part of an expansion program undertaken by Ferro and are being used to produce fiber-glass.

GE Re-Equipping Scranton Plant

Work has begun on converting the first part of General Electric Co.'s dishwasher plant in Scranton, Pa., for the production of electronic tubes. The 200,000-square-foot plant will be converted at a cost of several million dollars, with considerable new equipment to be installed.

Iron Fireman Broadens Product Line

Iron Fireman Mfg. Co., Cleveland, purchased the Petro oil burner business from Petroleum Heat & Power Co., Stamford, Conn., and will operate it as the Petro Oil Burner Division of Iron Fireman. The entire line of domestic, commercial and industrial oil burners and oil heating equipment will be manufactured in the Iron Fireman plant in Cleveland. J. R. Crews was appointed sales manager of the Iron Fireman Petro Division.

American Laundry Buys Buffalo Firm

J. E. Martin Equipment Corp., Buffalo, has been sold to the American Laundry Machine Co., Cincinnati, for about $300,000. Operations of the Buffalo firm are scheduled to be shifted to Cincinnati in September.

International Nickel Begins Project

International Nickel Co. has begun construction of a research laboratory and a plant for filtering iron precipitates from electrolytic solutions at Port Colborne, Ont. The project will cost about $300,000 and is scheduled for completion this fall.

Worthington Redesignates Plant

Worthington Corp., Harrison, N. J., redesignated its Dunellen, N. J., plant as the Plainfield Works. This plant manufactures construction equipment, welding equipment and industrial mixers.

Walter Kidde Opens Branch Office

Walter Kidde & Co. Inc., Belleville, N. J., is opening an office, showroom and service building at 4845 W. Exposition Blvd., Los Angeles. This will triple facilities available for Kidde's West Coast district organization. Sales and service of the district office's industrial products will be under the direction of Fred Buckley, while sales of equipment for aircraft will be headed by John Noble.

Quaker Rubber Establishes Branch

A stock carrying branch warehouse and sales office was established at 260 Schuyler Ave., Kearney, N. J., by Quaker Rubber Corp., a division of H. K. Porter Co. Inc., Pittsburgh. The new branch is under supervision of A. H. Smith, district manager for the New York area.

Famco Consolidates Operations

Famco Machine Co. purchased a plant and office facilities in Kenosha, Wis., as part of its expansion program. In addition to replacing the firm's two Racine, Wis., plants, enabling more efficient operation, the new buildings add about 40,000 square feet of floor space to Famco's operation. The move is scheduled to be completed in June. The company

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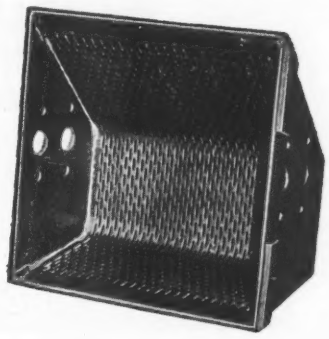

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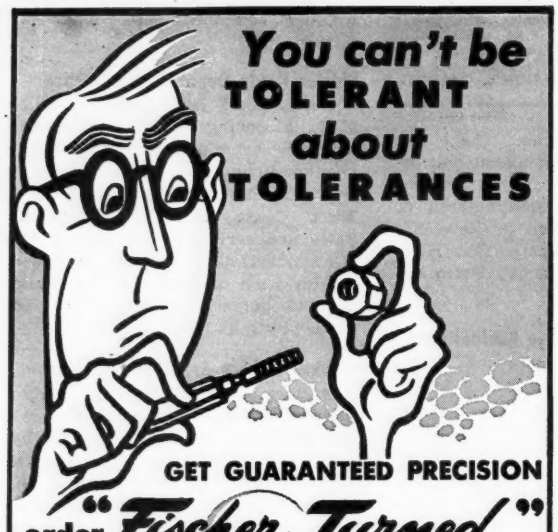
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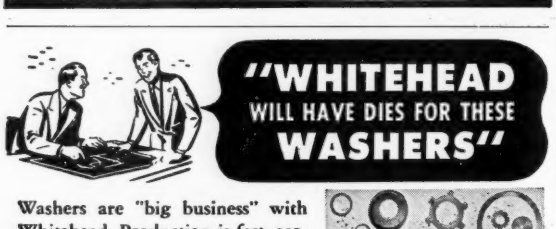
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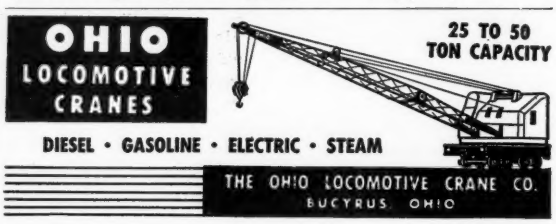
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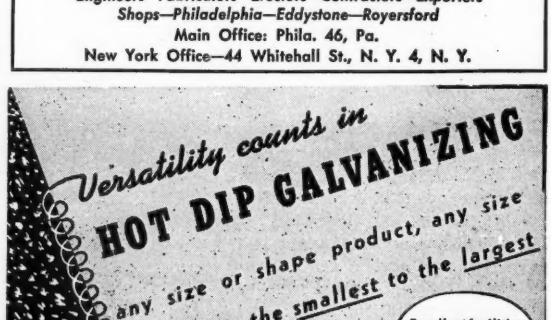
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manufactures arbor presses, power presses, squaring shears, drill presses, metal cut-off band saws, foot presses and air presses.

LaPine Opens Chicago Plant

Arthur S. LaPine & Co., Chicago, opened its new plant at 6001 S. Knox Ave., that city. The building contains a laboratory for testing and inspection of equipment, a complete machine shop for manufacture and repair of scientific equipment, and offices.

Woodall Plans To Build on Coast

Woodall Industries Inc., Detroit, will establish a branch plant at 801 W. Valley Blvd., El Monte, Calif., for the manufacture of aircraft parts. Operations are scheduled to start June 1.

Newcomer Continues To Expand

Newcomer Products Inc., Latrobe, Pa., is operating an additional plant which increases the company's production capacity by about 400 per cent. The company produces drills and bits used extensively in strip and underground mining operations and industrial cemented carbide cutting tools, used for cutting armor plate, forgings, cast iron, steel and many other metals. William Newcomer, president, says plans have been approved to begin almost immediately further expansion which will again more than double present capacity. The new project will be completed during 1952-53 and will provide new offices and additional production facilities.

National Supply Opens New Outlet

National Supply Co. Ltd., Toronto, opened on oil well equipment and supply store at Swift Current, Sask. Important discoveries of oil and gas in that province and the accelerated wildcatting program throughout Saskatchewan prompted the opening of the new store. R. W. Burns is the division manager.

Chamberlain Joins Schweizer Firm

George S. Chamberlain, former Buffalo aircraft executive, purchased an interest in Schweizer Aircraft Corp., Elmira, N. Y., and will take an active part in affairs of that company. He recently was elected a director.

English Electric Plans Expansion

English Electric Co. of Canada Ltd. will spend $1,250,000 during the next two years in a plant rehabilitation and development program at St. Catharines, Ont. Plans include erection of an addition to the transformer bay which will cost, including equipment, about $400,000.

Some Molding!

Baked resin-bonded shells are said to give precision casting at green sand casting costs. Operator is spraying parting on a permanent pattern on an automatic shell-molding machine made by Shell-O-Matic Corp., Newark, N.J., using Borden's Thor resin binders

Distributor Opens Seattle Branch

Clingan & Fortier Inc., aluminum and steel distributor, with warehouses in San Francisco and Los Angeles, opened a Seattle branch at 1047 Sixth Ave. S. Weston Hausman is the Seattle manager.

Babcock & Wilcox Co. Moves Offices

Babcock & Wilcox Co. opened offices at its new headquarters in the Chrysler Building East, 161 E. 42nd St., New York. Sales offices of the company's Tubular Products Division remain at 22 E. 40th St. The company has a research center and eight manufacturing plants in Ohio, Pennsylvania, Georgia, Mississippi, North Carolina and Texas. Its products are

WASHERS

—special sizes
—special shapes
—flat
—concentric
—standard sizes

We fabricate from:

lead	fusible metals
lead alloys	solder
clad bi-metals	brazing alloys
brass	bearing bronze
bronze	clock brass
copper	fibers
aluminum	plastics
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Rubbish to Riches

From rubbish like this collected at its mill and fabricating plants in Waterbury, Conn., Chase Brass & Copper Co. reclaims tons of clean alloy scrap by daily incineration and precipitation

separated into five general groups: Stationary boilers, marine boilers, tubes, refractories and special products.

Tuschman Steel Builds Warehouse

Tuschman Steel Co., scrap steel concern, Toledo, O., will use a building which has just been erected as a steel warehouse. The building has a floor area of 9600 square feet.

American Locomotive Opens Branch

American Locomotive Co., New York, opened a sales office at 219 E. Broad St., Richmond, Va., for its Railway Steel Spring Division. E. J. Brown is in charge of the new office.

Blackford Aircraft Moves Plant

Blackford Aircraft Co., Los Angeles, occupied a new plant at 8711 Mettler St., for tooling and fabrication of commercial and aircraft sheet metal assemblies.

Midway Names Representatives

Midway Tool Co. Inc., Melvin, O., manufacturer of auger bits, appointed the following as its representatives in the respective territories: H. H. Hobelman Co., San Francisco; A. L. Kiesler, New York; S & S Sales Co., Dallas; Milo Inc., Philadelphia.

Jergens Tool Gets Agency

Appointment of Jergens Tool Specialty Co., Cleveland, as a distributor for Allen Mfg. Co., Hartford, Conn., was announced by J. H. Schron, vice president of Jergens. The company manufactures standard jig and fixture components as well as sine fixture keys and chuck jaw blanks.

Rigidized Metals Renames Product

Rigidized Metals Corp., Buffalo, announces that all rolled metals it produces will now be known as Rigid-Tex Metal. These metals consist of both ferrous and nonferrous, solid or perforated, sheet or strip, coils or cut lengths.

Colotrym Builds Plant Addition

Colotrym Co., Seattle, is building an addition to its plant at 35 Hanford St. to produce aluminum extrusions. Ultimate plans include presses, heat treating and smelting equipment. Frank Hobbs is president.

Midcontinent Tube Buys Quarters

Midcontinent Tube Service Inc. purchase new office and warehouse facilities at 3146 W. Touhy Ave., Chicago. Midcontinent specializes in large diameter and heavy wall steel pipe and tubing.

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

OPEN TIME
Small custom contract manufacturing and fabricating plant wants domestic household item or similar to manufacture as a production line.
Equip.—Small presses, spot welders, lathes, surface grinder, milling machine, drill presses and tool room. Engineering and assembling available. Good shipping facilities.
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OPPORTUNITY
Structural and Plate Fabricator located in Southeast desires additional products. Will purchase outright or manufacture and sell on royalty basis. Very well rated. 20 men in Engineering Department, 125 men in Shop.
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WANTED IMMEDIATELY
LARGE
INDUCTION HEATING MOTOR GENERATOR SET
2500 to 10,000 cycles per second
Box 506, STEEL
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WANTED—MACHINERY
Wanted—5' or 6' x ¼" Power Square Shear. Should be in good condition, new or used.
Call or write—
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300 TON PRESS BRAKE
Will bend 20' x ¼" to 6' x ¾" Pl.
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1—167" x ¼" Sheet Squaring Shear
1—Pair Wean Tables for Hot Sheet Mill
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1—Riehle 80,000# Tensile & Compression Testing Machine
Immediate Delivery
Reasonable
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FOR SALE
Hyster YT-40 Fork lift truck with crane boom, 30" scoop attached, gasoline powered engine. Weight 6100 lbs.—wheelbase 56"
72" free lift, 30" load arms capacity, 4000 lbs.
Overall Height collapsed 97½"—Extended 167".
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398 West River St. Elyria, Ohio
Phone 2353

WANTED
SALESMEN
Large manufacturer of specialty steel products, located in the East, would like to secure the services of two men, preferably experienced, for the sale of their products. Company produces carbon and alloy hammer and press forgings. Would probably locate one man in the East and one man in the Midwest.
In replying state age, experience, education, etc. All replies will be held strictly confidential. Good opportunity for the accepted individuals. Write Box 514, STEEL, Penton Bldg., Cleveland 13, Ohio

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STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 50-Ton
Cabooses, Eight Wheel, Cupola Type
Flats, 40-and 50-Ton, Steel Underframe, 40'0"
Gondolas, Composite, 40-Ton Capacity
Gondolas, Composite or All Steel, 50-Ton and 70-Ton
Gondolas, All-Steel, 55-Ton, Solid Bottom
Hoppers, Covered, All-Steel, 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 3,000-Gallon, High Pressure

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

STANDARD GAUGE DUMP CARS

Four—30-Yd., 50-Ton Cap., All-Steel, Side Dump (Drop Door)
End Dump, 20-Yd., 50-Ton Drop Door End Dump, 10-Yd., 30-Ton Lift Door
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STANDARD GAUGE DIESEL LOCOMOTIVES

One Plymouth Diesel-Mechanical, 65-Ton, Type 0-6-0, Built 1940
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ESTABLISHED SALES ENGINEER covering the state of Michigan, wants a quality line in the industrial field. Background of metallurgy and production. Would prefer a product requiring technical sales. Write Box 512, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 14 years' staff and supervisory experience plant layout, machine design, new construction and project engineering seamless steel and electric weld tube mill installations and related plant facilities; desires relocate as responsible staff or administrative assistant. Midwest or far west preferred. Executive responses acknowledged. Reply Box 511, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXECUTIVE—progressive, 46, chief engineer Los Angeles plant employing 1000, 25 years mechanical and construction experience, seeks supervisory or managerial opportunity, any field of endeavor, anywhere. Write Box 499, STEEL, Penton Bldg., Cleveland 13, O.

PITTSBURGH REPRESENTATION SALESMAN calling industrial accounts, Tri-State area. Salary or commission basis. Conscientious, aggressive coverage. College degree, excellent references. Address Box 513, STEEL, Penton Bldg., Cleveland 13, Ohio.

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SALARIED POSITIONS $3,500 TO $35,000. WE offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

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To reorganize and head sales department. Salary commensurate with qualifications. Please state fully age, education, experience, etc.

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LATHE, 42" x 30' PUTNAM, M.D.
PRESS, TRIMMING, No. 6 W & W, 225 ton.
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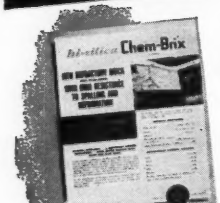
TYPE BRICK
Increases
FURNACE REFRACTORY LIFE!

In actual use for over two years, *chemically* bonded Hi-Silica Chem-Brix have proved to be superior to kiln-fired brick. When exposed to elevated temperatures in open hearth checker chambers, heating furnaces and soaking pits, Hi-Silica Chem-Brix develop a protective surface glaze that is high in silica. This exposed surface expands slightly, tightens the joints and seals out fluxing agents. Longer refractory life is assured—resulting in lower costs!

FOR HIGHER RESISTANCE TO SPALLING AND DEFORMATION
Look to...

hi-silica
Chem-Brix



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Get information now on Hi-Silica Chem-Brix. Send for bulletin giving data including physical properties and complete chemical analysis!

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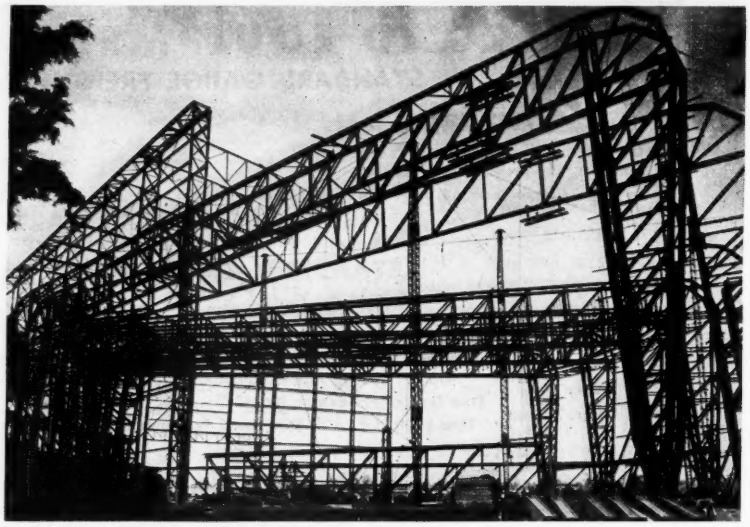


Quite a Welded Frame Up

Above are several of the eight welded rigid frames with clear spans of 328 feet, which are said to be the world's longest. Arranged in pie shape, they form the structure of Mexico City's $4.5 million municipal auditorium. Because of sandy subsoil conditions, this method was used to save about 50 per cent in weight

Pratt & Whitney Schedules Move

Eleven manufacturing departments and the supporting service departments required to maintain production operations are scheduled to move into Pratt & Whitney Aircraft's new multimillion dollar North Haven, Conn., branch plant this summer. Together with the enlarged Hamilton Standard plant adjoining its East Hartford plant, the engine division of United Aircraft Corp., that city, will gain about 1 million additional square feet of manufacturing space for the production of piston and jet engines. Leete P. Doty is plant superintendent of the North Haven plant.

Ohio Electric Operates New Unit

A new division for the manufacture of precision ground and roll threaded aircraft engine parts was announced by Ohio Electric Mfg. Co., Cleveland. The division was tooled and equipped and actually started volume production at the end of 1951. It is under contract to several major manufacturers of aircraft jet and reciprocating engines.

Huge Laboratory Project Started

Ground was broken recently for a $6 million steam and gas turbine development laboratory at the South Philadelphia Works, Westinghouse Electric Corp., Pittsburgh. Actual construction of the building will begin late this summer and will take about a year to complete. It will conduct initially special research for the Air Force.

Pacific Airmotive Expanding

Pacific Airmotive Corp., Burbank, Calif., started construction of a $350,000 building to house manufacturing, engineering and sales divisions. The structure also will contain areas for sales representatives, corporate pilots and eastern customers with an exhibit area for aircraft products.

Despatch Observes 50th Anniversary

Despatch Oven Co., Minneapolis, is celebrating its fiftieth anniversary this year. Despatch is one of the largest manufacturers of industrial ovens, furnaces and related metal processing and finishing equipment. C. P. Doherty is president and general manager of the company.

American Cyanamid To Build Plant

A plant for production of chemicals from natural gas will be built near New Orleans for American Cyanamid Co., New York. The plant will represent an investment of about $50 million.

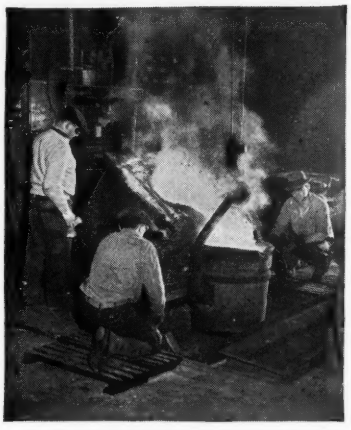
Electric Regulator Builds Plant

Electric Regulator Corp., Norwalk, Conn., is constructing a plant in that city for production of electric circuit controllers. Provision of 13,800 sq ft of laboratory and production area will accommodate the company's broad research and development program. It also will enable the company to manufacture many of its own tools essential to production.

LEBANON CIRCLE L Castings

in Stainless and Special Alloys...

require Control in Melting



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"In the Lebanon Valley"

CIRCLE L LEBANON *Steel and Alloy Steel* Castings

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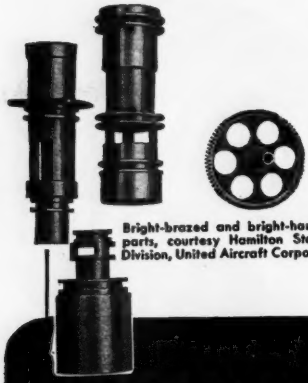

Bright-brazed and bright-hardened parts, courtesy Hamilton Standard Division, United Aircraft Corporation.

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Now, parts made of stainless can be BRIGHT-ANNEALED, BRIGHT-HARDENED or BRIGHT-BRAZED without oxidation, on a continuous production basis. They come from the controlled-atmosphere conveyor furnace scale-free, bright and clean.

No pickling, sand blasting or tumbling required. These costly operations are eliminated, so your parts retain their sharp design and edges. A special Sargeant & Wilbur alloy for bright-brazing makes the joint practically invisible because it resists dulling and matches the metal color perfectly. Steel and non-ferrous metal parts are brazed in the same operation with excellent results.

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Your samples processed FREE. To see your products bright-brazed, send samples and specifications.

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